

U.S. Fish and Wildlife Service

Fisheries Collaboration with National Wildlife Refuges

FY2013 Progress Report



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On the cover: Tidal channel with woody debris at Bandon Marsh National Wildlife Refuge
(Photo: S. Lohr).

The correct citation for this report is:

Lohr, S.C., M.L. Koski, and T.A. Whitesel. 2015. Fisheries Collaboration with National Wildlife Refuges, FY2013 Progress Report. U.S. Fish and Wildlife Service, Columbia River Fisheries Program Office, Vancouver, WA. 88 pp.

FISHERIES COLLABORATION WITH NATIONAL WILDLIFE REFUGES FY2013 PROGRESS REPORT

Study funded by

U.S. Fish and Wildlife Service
Fisheries Operating Needs System
A-206, A-226, A-234

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Final
January 21, 2015

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FISHERIES COLLABORATION WITH NATIONAL WILDLIFE REFUGES FY2013 PROGRESS REPORT

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Executive Summary – The missions of National Wildlife Refuges (NWRs) and the Columbia River Fisheries Program Office (CRFPO) share several complementary elements concerning aquatic species and habitats. Thus, the goal for CRFPO activities with NWRs is to conduct cooperative work in an efficient and effective manner to conserve aquatic resources. Objectives were to: 1) Provide a forum to promote effective information exchange and coordination among NWRs, CRFPO, Fisheries, and other U.S. Fish and Wildlife Service (USFWS) programs; 2) Assist in the development of Comprehensive Conservation Plans (CCPs) for various NWRs; 3) Conduct field-based activities contributing to conservation of aquatic resources at NWRs; and 4) Provide non-field-based technical assistance on aquatic resources for NWRs. For Objective 1, the CRFPO organized and hosted a workshop that was attended by 41 individuals in FY2013, 7 NWRs, and 5 USFWS programs. Notes and actions items were developed. For Objective 2, the CRFPO conducted various activities supportive of CCPs for four NWRs. For Objective 3, two projects consisting of field-based activities contributing to conservation of aquatic resources at NWRs were conducted. These were: Restoration monitoring at Bandon Marsh NWR, and Post-construction assessment of fishes, habitats, and tide gates in sloughs on the mainland of Julia Butler Hansen NWR. For Objective 4, the CRFPO provided non-field-based technical assistance consisting of a long-term activity (i.e., development of a long-term aquatics monitoring program at NWRs for climate change, which has spanned fiscal years) and short-term activities (e.g., reviews of literature and regulatory documents, which typically concluded in a matter of days).

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Table of Contents

List of Tables	iv
List of Figures	iv
Introduction.....	5
Relationship to the Fisheries Program Strategic Plan	7
Approach.....	8
Objective 1: Provide a forum to promote effective information exchange and coordination among NWRs, CRFPO, Fisheries, and other Service programs	8
Objective 2: Assist in the development of CCPs	9
Objective 3: Conduct field-based activities contributing to conservation of aquatic resources at NWRs	9
Objective 4: Provide non-field-based technical assistance on aquatic resources for NWRs	9
Products.....	9
Objective 1: Provide a forum to promote effective information exchange and coordination among NWRs, CRFPO, Fisheries, and other Service programs	10
Objective 2: Assist in the development of CCPs	11
Objective 3: Conduct field-based activities contributing to conservation of aquatic resources at NWRs	11
Restoration monitoring at Bandon Marsh NWR	12
Post-construction assessment of fishes, habitats, and tide gates in sloughs on the mainland of Julia Butler Hansen NWR	13
Objective 4: Provide non-field-based technical assistance on aquatic resources for NWRs ...	14
Long-term activities	14
Short-term activities	15
Conclusions.....	15
Acknowledgements.....	16
Literature Cited	17
APPENDIX A: 2013 NWR-FISHERIES WORKSHOP AGENDA, NOTES, ATTENDEES, ACTION ITEMS, AND PRESENTATIONS	19
APPENDIX B: PROJECT REVIEW	82

List of Tables

Table 1. Number of individuals by USFWS program and office that participated the annual workshop during 2013.	10
Table 2. NWR and summary of tasks conducted by the CRFPO supportive of CCPs during FY2013.	12

List of Figures

Figure 1. Locations of National Wildlife Refuges in Idaho, Oregon, and Washington within the general geographic area of responsibility of the CRFPO (green circle) and outside the general area of responsibility (blue circle).	6
Figure 2. Examples of estuarine fish species found at Bandon Marsh NWR, starry flounder (left) and silver surf perch (right). (Photo by B. Silver)	13
Figure 3. Examples steel top-hinged tide gates (left) and aluminum side-hinged tide gate with self-restraining assembly to hold door fully open (right). (Photo by J. Johnson).....	14

Introduction

The U.S. Fish and Wildlife Service (USFWS) is increasing interaction and collaboration among its programs, which is reflected in various plans. For instance, the Pacific Region Fisheries Program Strategic Plan supports cross-program collaboration to provide varied expertise for aquatic habitat conservation and management issues (USFWS 2008; see Regional Objectives 2.1-2.4 relative to cross-program collaboration), and the National Wildlife Refuge System has committed to working with programs throughout the USFWS and other conservation partners to achieve shared conservation goals (USFWS 2011). Capitalizing on diverse expertise and achieving shared conservation goals among programs, including associated field stations, and other partners ultimately improves efficiency of the USFWS, potentially allowing the USFWS to expand conservation delivery.

The Columbia River Fisheries Program Office (CRFPO) has a history of working with National Wildlife Refuges (NWRs), primarily within its geographic area of responsibility (i.e., Columbia River basin below McNary Dam, waters in Oregon excluding the Klamath River basin, and small tributaries of Willapa NWR; see Figure 1), on aquatic resource issues. This work history has contributed to the missions of both the CRFPO and NWRs. The mission of the CRFPO is to:

- Assist in the status review of imperiled natural stocks;
- Evaluate management measures for recovery;
- Assist in recovery efforts for imperiled stocks; and
- Work to prevent the need for future listings under the Endangered Species Act.

The mission of the NWR system is: “To administer a network of lands and waters for the conservation, management and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” The mission, as well as administrative processes and guidance for determining management direction of NWRs, was included in the National Wildlife Refuge System Improvement Act of 1997, which amended earlier legislation. The legislation mandated that wildlife and wildlife conservation must come first in administering the system. Several policies and Director’s Orders have been developed to assist in complying with the provisions of the legislation.

In applying NWR policies and orders, overall management direction and specific activities on each NWR, or individual management unit of a NWR, are determined by several factors. The foremost factor is that management achieves the purposes for which a NWR or unit was established, and in so doing, contributes to fulfilling the NWR System mission. Implicit within fulfilling the NWR System mission is the maintenance and, where appropriate, restoration of biological integrity, diversity, and environmental health of NWRs, as well as management of legislatively mandated trust species. Trust species include migratory birds, inter-jurisdiction fish, some marine mammals, and species listed under the federal Endangered Species Act. The relations among NWR purpose, NWR System mission, directives, and legislative mandates influence management goals, objectives, and strategies described in Comprehensive Conservation Plans (CCPs) developed for each NWR.

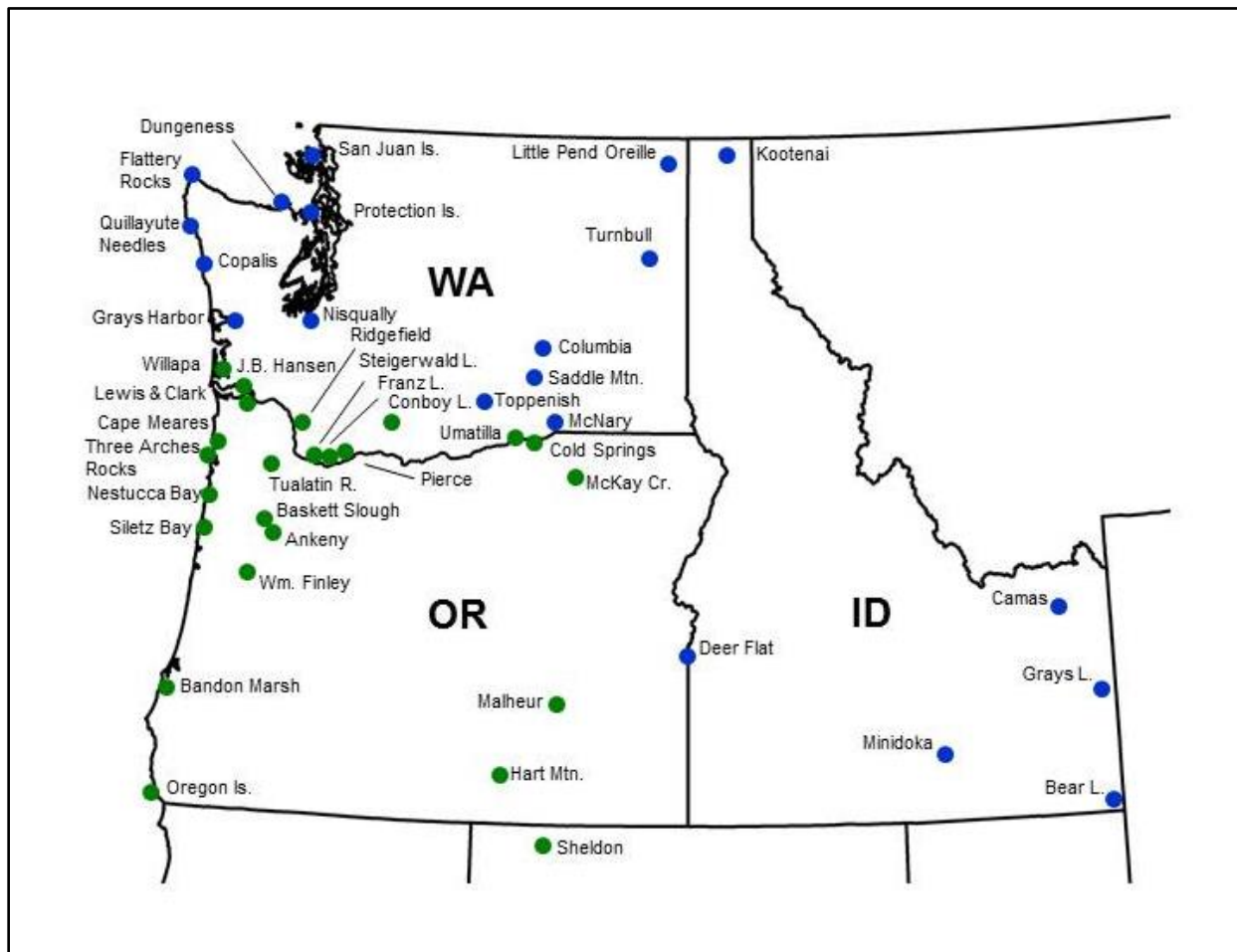


Figure 1. Locations of National Wildlife Refuges in Idaho, Oregon, and Washington within the general geographic area of responsibility of the CRFPO (green circle) and outside the general area of responsibility (blue circle).

The missions of NWRs and the CRFPO share several complementary elements. These concern aquatic species and habitats that may be subject to the purposes for which a NWR was established as well as the maintenance and potential restoration of biological integrity, diversity, and environmental health relative to aquatic species and habitats. Thus, the CRFPO and NWRs have sought to promote effective information exchange between programs, as well as other USFWS programs, to increase opportunities for collaborative work. This Annual Report describes the CRFPO collaborative activities with NWRs during FY2013. The goal of the activities was to conduct cooperative work with NWRs and other Service programs to conserve aquatic resources. Objectives were to: 1) Provide a forum to promote effective information exchange and coordination among NWRs, CRFPO, Fisheries, and other USFWS programs; 2) Assist in the development of Comprehensive Conservation Plans (CCPs); 3) Conduct field-based activities contributing to conservation of aquatic resources at NWRs; and 4) Provide non-field-based technical assistance on aquatic resources for NWRs.

Relationship to the Fisheries Program Strategic Plan

Implementation of this project demonstrates application of the Pacific Region's 2009-2013 Fisheries Program Strategic Plan. The following National goals (NG) and Regional objectives (RO) have been addressed by this project during FY2013, and brief descriptions from the CRFPO perspective and examples (in parentheses) are provided.

- NG1 Open, interactive communication between the Fisheries Program and its partners.
- RO1.1 Develop and maintain relationships with partners throughout the Pacific Region.
- Project encouraged collaborative partnerships with NWRs in Region 1 and maintained partnerships with NWRs individually (e.g., for specific projects or issues) and collectively (e.g., 2013 workshop).
- RO1.2 Implement a means of providing feedback to ensure the long-term success of partnerships.
- Feedback was encouraged through annual workshops where topics varied based on a variety of ongoing or recent activities and feedback (e.g., 2013 workshop).
- RO1.3 Improve data collection and management and internal and external reporting to reduce redundancy and improve access and usefulness for ourselves and our partners.
- Fisheries technical assistance and data are often identified as aquatic resource needs of NWRs. Data, assessments, and recommendations were provided to NWRs to the extent possible (e.g., fish use data for Bandon Marsh NWR).
- NG2 America's streams, lakes, estuaries, and wetlands are functional ecosystems that support self-sustaining communities of fish and other aquatic resources.
- RO2.3 Coordinate with Service NWRs and NFHs to identify and implement opportunities for increasing the quantity and improving the quality of aquatic and riparian habitat.
- Assisted in evaluating conceptual plans to restore aquatic habitat on NWRs, made recommendations on improvements to projects, and assisted with developing environmental compliance documents (e.g., provided input on proposed actions on NWRs in lower Columbia River and reviewed draft Environmental Assessments).
- NG3 Self-sustaining populations of native fish and other aquatic resources that maintain species diversity, provide recreational opportunities for the American public, and meet the needs of tribal communities.

- RO3.1 Collaborate with Ecological Services (ES) Program, National Oceanographic and Atmospheric Administration Fisheries (NOAA Fisheries) and others, to recover fish and other aquatic resource populations protected under the ESA.
- Participated on multi-agency technical teams to provide technical assistance in developing long-term management plans for NWRs where listed species occur (e.g., extended teams for CCPs).
- RO3.2 Maintain healthy, diverse, self-sustaining populations of fish and other aquatic resources
- Participated on multi-agency technical teams to provide technical assistance in developing long-term management plans for NWRs (e.g., extended teams for CCPs).

Approach

To promote effective information exchange, NWRs and the CRFPO held an initial workshop in 2005 that informed the CRFPO of aquatic resource issues and needs at NWRs, informed NWRs about fisheries expertise at the CRFPO and results of ongoing work, and explored possibilities for cooperative efforts. Outcomes of the workshop (USFWS 2005) were identification of contacts for issues concerning CRFPO work with NWRs (i.e., at CRFPO, Regional Office—Fisheries, NWR—Supervisor, NWR—Branch of Biology), and commitments from the CRFPO to assist with development of CCPs, work with NWRs to determine fisheries needs, and jointly pursue funding (e.g., proposals submitted for Cross Program Recovery (CPR) funds, entered into the Fishery Operational Needs System (FONS)) for needs that cannot be addressed with existing resources.

The initial workshop and its outcomes established an overall approach that has been followed to address the goal of conducting cooperative work with NWRs to conserve aquatic resources and associated objectives of this project, which, in addition, has encouraged direct communication between the CRFPO and individual NWRs.

Objective 1: Provide a forum to promote effective information exchange and coordination among NWRs, CRFPO, Fisheries, and other Service programs

With the exception of 2006, workshops have been held annually since 2005 (see USFWS 2007; 2008, 2009a, 2009b; Lohr et al. 2012, 2014). A central focus of the workshops has been to provide a forum to discuss aquatic resource issues and needs at NWRs as well as present results of ongoing fisheries work. The workshops also provide opportunities to consider various topics (e.g., regional and national initiatives, resource assessments by other agencies or universities) and engage additional USFWS programs. Extensive notes summarizing presentations and discussion are taken, and action items are generated at or after workshops to address aquatic resource needs and initiatives. Workshops are scheduled in the spring to reduce conflicts with the typical field season, and topics often are at the request or suggestion of participants.

In addition, the CRPFO conducts reviews to assess and direct activities of overall projects. The project review process consists of an open seminar to provide information about a project to

those interested, and is followed by a meeting among pertinent CRFPO personnel to develop action items intended to improve the project.

Objective 2: Assist in the development of CCPs

The CRFPO has contributed to the development of CCPs for all NWRs that have requested Fisheries assistance. Most often, CRFPO personnel have conducted various tasks as a member on an extended planning team. These tasks include: Literature search and review to provide technical information pertinent to aquatic resources, issues and species; Assistance in the crafting of objectives, habitat attributes, management strategies, and rationale; Technical review of drafts; and Participation in team meetings and briefings.

The CRFPO also has assisted with various inventory or monitoring assessments and plans that contribute to CCP implementation. These assessments and plans were conducted by the National Wildlife Refuge System's Natural Resource Program Center (NRPC) and Inventory and Monitoring Initiative (I & M Initiative), which provide a coordinated approach to support resource management and conservation.

Objective 3: Conduct field-based activities contributing to conservation of aquatic resources at NWRs

At the 2005 workshop, the CRFPO committed to work with NWRs in determining fisheries needs and likely actions necessary to address them. Overall, past experiences have found that most fishery needs and associated actions can be placed in one of three categories: 1) Requiring expertise beyond that at the CRFPO or outside its purview, for which suggestions on accessing appropriate expertise may be made; 2) Requiring extensive field-based activities; and 3) Requiring technical assistance without field-based activities (see Objective 4, below).

Examples of field-based activities contributing to conservation of aquatic resources include assessments of habitat restoration actions on targeted habitat attributes and aquatic species, and also relatively broad-scale inventories for the presence and distribution of aquatic habitats and species. Because the costs of conducting such activities typically exceed existing resources of NWRs and the CRFPO, funding is pursued internally (e.g., through CPR, FONS, I&M Initiative) and externally (e.g., U.S. Army Corps of Engineers).

Objective 4: Provide non-field-based technical assistance on aquatic resources for NWRs

Non-field-based technical assistance includes a suite of activities such as providing information concerning aquatic resources, reviewing permitting or other documents, and participating on technical advisory groups. Because these activities do not incur the costs typically required for extensive field work, the CRFPO attempts to fulfill these needs to the greatest extent possible with existing personnel and funds.

Products

Activities and associated products for addressing each of the four project objectives during FY2013 are discussed below.

Objective 1: Provide a forum to promote effective information exchange and coordination among NWRs, CRFPO, Fisheries, and other Service programs

The CRFPO and Regional Branch of Refuge Biology organized and hosted a workshop on May 9, 2013. A total of 41 individuals participated in the workshop, which included 5 USFWS programs (Table 1). For the Fisheries Program, representatives from each Fishery Resource Office (i.e., CRFPO, Idaho, Mid-Columbia, and Western Washington), Abernathy Fish Technology Center, and Regional Office attended. For the Refuge Program, representatives from seven NWR units attended, in addition to the Regional Office (Branch of Refuge Biology and I&M Initiative). Ecological Services, Water Resources, and Science Applications also were represented.

Table 1. Number of individuals by USFWS program and office that participated the annual workshop during 2013.

Program/office	Individuals
Fisheries	
CRFPO	11
Fishery Resource Office/Fish Technology Center	4
Regional Office	1
Refuges	
NWRs	15 (7) ¹
Regional Office	6
Ecological Services	1 ²
Water Resources	1
Science Applications	1
Other ³	1
Total individuals	41

¹ Number of NWR units represented in parentheses (NWR complexes were considered a single unit).

² Included individual in in a joint Ecological Services-Fisheries position.

³ Portland State University.

The agenda, notes, list of attendees, actions items, and presentations made by USFWS personnel have been compiled (see Appendix A). The goal and objectives for the workshop are presented here.

Goal—Provide a forum to promote effective information exchange and coordination among NWRs, CRFPO, PFW, Fisheries, and other Service programs.

Objectives—

1. Update about results and activities by NWRs to address aquatic resource issues and needs.

2. Update on status of Fisheries Project Leaders' initiative to develop long-term aquatic monitoring program at NWRs.
3. Provide information on status and results of programs and activities of regional or broader interest.
4. Identify and discuss aquatic resource issues and needs at NWRs and updates on management planning.
5. Explore additional possibilities for cooperative efforts among NWRs, Fisheries, PFW, and others.
6. Develop action items.

A project review was held for "Fisheries Collaboration with NWRs" on April 18, 2013. Attendees of the seminar included multiple representatives of RO Fisheries and RO Refuges, in addition to the CRFPO (see Appendix B for seminar presentation). Action items, to be implemented in FY2014, generated during the meeting portion of the project review included:

- Consideration of strategic habitat conservation, climate change, and inventory of aquatic resources in the justification of the project;
- Incorporation of strategic habitat conservation in the goal;
- Expansion of scope to include all Fishery Offices and NWRs on the R1 mainland, co-hosting workshop jointly between Fisheries and Refuges, varying workshop location, revising NWRs templates every five years, and making workshops available via webinar;
- Solicitation of involvement by RO Fisheries personnel in interactions between Fisheries and NWRs;
- Addition of two new objectives—1) Establish sentinel sites at NWRs to assess evidence of climate change in physical attributes and aquatic communities in streams; and 2) Ensure data generated through collaborative work is managed and reported according to the Region 1 Information Management Strategy.

Objective 2: Assist in the development of CCPs

The USFWS Division of Refuges has developed a systematic approach for the comprehensive conservation planning process (USFWS Manual 602 FW 3), including preplanning, adoption of a final plan, implementation, and plan review and revision. Because time necessary to produce a final CCP may be several years, the CRFPO assisted with tasks for CCPs at various stages of development (i.e., ranging from preparation for preplanning to review of public drafts), as well as activities supportive of completed CCPs such as development of Inventory and Monitoring Plans (IMPs) and Water Resource Inventory and Assessment (WRIA). Work by the CRFPO related to CCPs was conducted for four NWRs in FY2013 (Table 2).

Objective 3: Conduct field-based activities contributing to conservation of aquatic resources at NWRs

Two projects consisting of field-based activities contributing to conservation of aquatic resources at NWRs were conducted by the CRFPO during FY2013. These were: Restoration monitoring at Bandon Marsh NWR, and Julia Butler Hansen National Wildlife Refuge-Post-construction assessment of fishes, habitats, and tide gates. These were ongoing projects initiated in earlier

years and continued during FY2013. The need for information that these projects have generated was identified by NWRs during the initial workshop (USFWS 2005). Brief summaries of the projects are presented here along with citations of reports containing project details and findings.

Table 2. NWR and summary of tasks conducted by the CRFPO supportive of CCPs during FY2013.

NWR	Tasks
Hart Mountain NAR	Conducted literature review concerning aquatic resources and participated on biological and management review as preplanning for preparation to develop CCP.
Malheur NWR	Attended briefing and provided review and comments on draft IMP.
Tualatin NWR	Reviewed and commented on public draft of CCP.
William L. Finley NWR	Provided information on aquatic resources for scoping to develop WRIA.

Restoration monitoring at Bandon Marsh NWR

Large-scale tidal marsh restoration, entailing dike and tide gate removal, culvert upgrades, channel and wetland construction, and infrastructure upgrades, was conducted at the Ni-les'tun Unit of Bandon Marsh NWR. All activities were completed by summer 2010 except removing the dike and tide gates, which was completed in August 2011. The goal of the monitoring project is to assess changes in the aquatic species community before and after habitat restoration by addressing four objectives—1) Describe and compare fish species community within and among restoration areas and reference areas before and after construction; 2) Describe and compare fish species distribution within and among restoration areas and reference areas before and after construction; 3) Describe and compare fish species relative abundance within and among restoration areas and reference areas before and after construction; and 4) Collect invertebrates to archive from restoration areas and reference areas before and after construction.

To characterize conditions before habitat restoration, fish (Figure 2) typically were collected on one or two occasions per season during November 2007-March 2010 (Hudson et al. 2010). Fish were collected once per season during October 2010-June 2011, which was considered an interim period for restoration and occurred during FY2011 (Silver et al. 2012). Since completion of final construction activities (i.e., removal of the dike and tide gates), fish were collected on six occasions during each FY2012 (Hudson et al. 2013) and FY2013. Prior to receiving funding

from Region 1 Refuge I&M Initiative during FY2011-FY2013, the project was largely funded by other internal sources (e.g., Challenge Cost Share, Cross Program Recovery).

Post-construction assessment of fishes, habitats, and tide gates in sloughs on the mainland of Julia Butler Hansen NWR

The NWR has been working with the U.S. Army Corps of Engineers (Corps) for several years on modifications to tide gates for improving aquatic habitats and fish access to sloughs while maintaining adequate habitat conditions for the endangered Columbian white-tailed deer. For instance, the Corps replaced a series of steel top-hinged tide gates (Figure 3) on the largest slough of Tenasillahe Island with aluminum side-hinged gates fitted with orifices in 2007, and on the Mainland Unit, installed aluminum side-hinged gates fitted with self-restraining assemblies to hold gates fully open before closing on three sloughs in 2010 and two sloughs in 2011. The goal of the monitoring project was to assess effects of the tide gates on fish communities and aquatic habitat by addressing three objectives—1) Assess the periods, frequency, and duration that tide gates (as presently configured, after modifications, and newly installed) are conducive to passage by juvenile and adult salmonids; 2) Describe presence, distribution, and biological characteristics (e.g., species, size) of fish inhabiting sloughs at Julia Butler Hansen NWR (pre-and-post construction) and compare to that observed at reference sloughs; and 3) Characterize habitats of sloughs at Julia Butler Hansen NWR and compare to that observed at reference sloughs (pre-and post-construction). The overall approach was to collect information for at least two years characterizing the pre-construction period and for at least two years characterizing the post-construction period.



Figure 2. Examples of estuarine fish species found at Bandon Marsh NWR, starry flounder (left) and silver surf perch (right). (Photo by B. Silver)



Figure 3. Examples steel top-hinged tide gates (left) and aluminum side-hinged tide gate with self-restraining assembly to hold door fully open (right). (Photo by J. Johnson)

The assessment of tide gates at Tenasillahe Island was conducted during 2007-2009 (Poirier et al. 2006; Johnson et al. 2007 a, b; Johnson et al. 2009a), and data collected at the Mainland Unit during 2007-2012 (Johnson et al. 2009b, 2011). During FY2013, the CRFPO surveyed sloughs on both Tenasillahe Island and the Mainland Unit as part of research supported by the Corps to assess multi-scale action effectiveness in the lower Columbia River and estuary. Field activities for this work was discontinued during FY2013. The project overall was funded by various sources of the Corps (e.g., Columbia River Channel Improvement Project, Section 526 of the Water Resources Development Act of 2000).

Objective 4: Provide non-field-based technical assistance on aquatic resources for NWRs

Non-field-based technical assistance during FY2013 consisted of long-term and short-term activities. Long-term activities were those with continuing tasks that spanned fiscal years and often led to additional tasks. Short-term activities were those tasks that typically concluded within a matter of days or less.

Long-term activities

The CRFPO engaged in one long-term activity with NWRs during FY2013, which was to develop a long-term aquatics monitoring program for climate change at NWRs on the mainland of R1. This activity supports a Fisheries Project Leaders' initiative to address climate change. Primary activities included: 1) The Fisheries workgroup (i.e., representatives from CRFPO, Idaho FRO, Mid-Columbia FRO, and Western Washington) developing a draft proposal for the program; 2) R1 Fisheries Project Leaders review of the proposal; 3) NWR review requested; and 3) Proposal presentation at the 2013 NWR-Fisheries Workshop and broader review requested. A predominant recommendation from the broader review was to develop an explicit, systematic approach to select NWR as sentinel sites that considered various attributes (e.g., watershed conditions and vulnerability to non-climate-related stressors, relative stream reach on an NWR). A cross-program team, consisting of representatives from each Fisheries Office, R1 Refuges

Branch of Biology and I&M Initiative, and Water Resources, began work on developing the approach to assess NWRs.

Short-term activities

Short-term activities during FY2013 included:

- Participated in meetings and webinars by NWR planners working on the Willamette Valley Conservation Study Area (WVCSA), provided input on scorings for ecological and management criteria used to select species as conservation targets.
- Provided technical review of three assessments (stream habitat, fish passage, and groundwater) conducted by the Lower Columbia Fish Enhancements Group for Pierce NWR to identify potential salmon and habitat restoration projects, participated on field tours to the NWR.
- Assisted in development and technical review of draft Environmental Assessment and Implementation Plan prepared by the Corps to restore connectivity between the Columbia River and Post Office Lake at Ridgefield NWR.
- Provided technical review of draft Environmental Assessments prepared by the Columbia River Estuary Study Taskforce for habitat restoration actions at two NWRs (Julia Butler Hansen, Lewis and Clark), participated on site visits.
- Reviewed study plan, and resulting special use permit, proposed by ODFW to conduct surveys of Alvord chub at Sheldon NWR.
- Compiled aquatic survey data and provided summary of fish species composition and distribution to assist interagency workgroup addressing mosquito issues at Bandon Marsh NWR,.

Conclusions

There was extensive collaboration between the CRFPO and NWRs on conservation of aquatic resources during FY2013. The other three Fishery Resource Offices in Region 1 and Abernathy Fish Technology Center participated in the annual workshop, highlighting overall healthy collaboration between the Fisheries Program and NWRs. In upcoming years, addressing the additional objectives generated during the project review will further encourage collaboration. During the period addressed by this report, the CRFPO was involved in activities supportive of four CCPs, which not only provided a means for Fisheries input into NWR planning, but also encouraged cross-program interactions that fostered professional relationships. Field-based activities, which have been made possible through various funding sources, have generated information for assessing the efficacy of habitat restoration actions and establishing baselines, both of which will improve our knowledge base and management of aquatic resources by the USFWS. Conducting non-field-based activities have provided fisheries technical assistance to a substantial variety of issues, which has supported the missions of Fisheries, Refuges, and the USFWS overall.

Acknowledgements

We would like to thank the numerous individuals who have contributed to and supported collaborative work described in this report, namely personnel of the R1 National Wildlife Refuge System, Branch of Refuge Biology, Branch of Inventory and Monitoring, NWR complexes and individual units in Washington, Oregon, and Idaho; R1 Fishery Resources, Idaho FRO, Mid-Columbia River FRO, Western Washington Fisheries, CRFPO; R1 Water Resources; and many others.

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**APPENDIX A: 2013 NWR-FISHERIES WORKSHOP AGENDA, NOTES,
ATTENDEES, ACTION ITEMS, AND PRESENTATIONS**

NWR-FISHERIES WORKSHOP AGENDA

May 9, 2013

Columbia River Fisheries Program Office

1211 SE Cardinal Court, Suite 100

Vancouver, WA 98683

Goal: Provide a forum to promote effective information exchange and coordination among NWRs, CRFPO, PFW, Fisheries, and other Service programs.

Objectives:

1. Update about results and activities by NWRs to address aquatic resource issues and needs.
2. Update on status of Fisheries Project Leaders' initiative to develop long-term aquatic monitoring program at NWRs.
3. Provide information on status and results of programs and activities of regional or broader interest.
4. Identify and discuss aquatic resource issues and needs at NWRs and updates on management planning.
5. Explore additional possibilities for cooperative efforts among NWRs, Fisheries, PFW, and others.
6. Develop action items.

10:00-10:05 Welcome and overview of workshop (Sam Lohr)

1. Aquatic resource activities and issues at NWRs

10:05-10:35 Hydrology at Wapato Lake and restoring the historic channel of Chicken Creek, Tualatin NWR (Pete Schmidt)

10:35-11:05 Overview of Bear River Estuary restoration, Willapa NWR (Jackie Ferrier)

11:05-11:35 Baseline aquatic invertebrate sampling in an isolated Columbia River floodplain lake, Ridgefield NWR (Alex Chmielewski/Monte Mattsson)

11:35-12:05 Aquatic resource sampling and monitoring on McNary NWR (Lamont Glass/Kevin Goldie)

12:05-1:00 Lunch

2. Updates and initiatives of regional or broader interest

1:00-1:30 Progress on the Fisheries initiative to develop a long-term aquatic monitoring program for climate change at R1 NWRs (Sam Lohr)

1:30-2:00 Activities of the Regional Climate Board (Mike Hudson)

2:00-2:30 Update on the Surrogate Species Initiative (Paul Heimowitz)

- 2:30-3:00 Update on the R1 Inventory and Monitoring Program (Kevin Kilbride/Erin Stockenberg)
- 3:00-3:15 Break
3. NWR updates and new issues and needs
- 3:15-4:30 Open discussion of new NWR issues and needs, updates on previous issues and needs, CCP schedules and progress, upcoming work, etc. at each NWR
- 4:30 Wrap-up

NWR-FISHERIES WORKSHOP NOTES

May 9, 2013

Hydrology at Wapato Lake and restoring the historic channel of Chicken Creek, Tualatin NWR (Pete Schmidt)

Tualatin River NWR has ongoing aquatic habitat projects at Wapato Lake and Chicken Creek. Wapato Lake historically consisted of a 1,200-acre wetland complex that received water from several creeks and overflow from the Tualatin River. Later, dikes, ditches, and pumps were used to alter the natural hydrology so that the area could be farmed. Since recently acquiring the area, the NWR has been supporting assessments (e.g., LiDAR survey, flow study) that will assist in management planning and possible habitat restoration. Chicken Creek consists of almost 40 miles of stream that flows through the town of Sherwood and crosses the NWR before entering the Tualatin River. The lower reach of the creek has been channelized and a portion of flow diverted into managed wetlands. Primary issues include increased stream flows due to development in the watershed, which exceeds capacity of the diversion structure and associated fish ladder, fish screens at the diversion likely do not meet standards because they were installed prior to salmon listings, and some managed wetlands are not functioning as intended. The NWR is working with Ducks Unlimited and has submitted a proposal for funding to the Oregon Watershed Enhancement Board to develop conceptual designs and preliminary engineering for the lower reach. Intent of the project is to: allow the creek back into the historic channel, provide unobstructed fish passage, maintain some managed wetlands, improve floodplain connectivity, and maintain western pearlshell mussel, which occur in the channelized portion of the creek.

Questions/discussion—

Q Why did the T-Rex cross the road?

A To eat the chicken.

Q What is the status of planning for the project?

A No planning has been completed yet. Intent of the OWEB proposal is to develop concepts and early designs to handle the current hydrology. All new developments have storm water retention ponds, but these overflow when it rains a lot. There is no planning timeframe at this time. Also, the Service holds some water rights in the creek.

Q Is there any evidence of stream meanders in the prairie area?

A Yes, the historic footprint of the creek with meanders is visible on Google Earth. The creek in some of the area would not be restorable because of private property.

Overview of Bear River Estuary restoration, Willapa Bay NWR (Jackie Ferrier)

Willapa NWR is beginning the second phase of a five-phase project to restore tidal marsh habitat in the Bear River Estuary, primarily by removing dikes. By the 1950s, about five miles of dikes had been constructed to create pastures in southern Willapa Bay. Because the dikes separated streams (e.g., Riekkola, Porter Point and Lewis creeks) from the estuary, maintaining pastures was difficult due to water influx. Areas behind the dikes were converted to freshwater wetlands in the 1980s, and two fish ladders were constructed in 2001 to allow fish (primarily coho salmon and coastal cutthroat trout) passage between the estuary and Lewis and Porter Point

creeks. Maintenance of the infrastructure and freshwater wetlands was high. With control of spartina in the bays, plans were developed to rebuild a healthy, functioning natural estuary to benefit migratory birds and fish, and contribute to the overall health of Willapa Bay. The entire project includes removing five miles of dikes, which will restore 500 acres of tidal marsh, removing infrastructure, filling ditches, and reestablishing historic stream and channel connections. Phase 1 (removing the dike and fish ladder at Lewis Creek) was completed in 2012, and Phase 2 (removing the dike and fish ladder at Porter Point) will be completed in 2013. Combined, these phases will restore 300 acres and reestablish 13 stream connections. The remaining phases, for which funding is being pursued, include removing the Riekkola dike after a setback dike is constructed. The project also includes a variety of monitoring, which has documented increases in waterfowl use and chum and coho salmon spawning in Lewis Creek since completion of Phase 1. The National Fish Habitat Partnership named the Bear River Estuary Project the second of the nation's top ten waters to watch.

Questions/discussion—

Q What is the status for funding the remaining phases?

A We are looking into various sources. The Pacific Marine and Estuary Fish Habitat Partnership submitted a combination of projects for consideration by NOAA, which included the remaining phases (\$900K total with over a third for three years of monitoring). There has not been any word on the application.

Q How will all the data generated by the project going to be handled?

A Putting all the information together in one place is a current need.

--Although there currently is not any formal monitoring of fish in newly accessible streams that once had salmon, it would be a good opportunity to collect tissue samples to determine the origin of fish that are now colonizing the streams.

--There are additional opportunities to improve access to spawning habitat on the refuge by removing a remaining barrier to Greenhead Slough at Highway 101.

Macroinvertebrate and vegetation survey 2012: Post Office Lake and Campbell Lake, Ridgefield NWR (Monte Mattsson)

Aquatic macroinvertebrate surveys were conducted on two lakes (Post Office Lake and Campbell Lake) at Ridgefield NWR during May—August 2012, and vegetation surveys were conducted on Post Office Lake during August. Objectives of the surveys were to: 1) Create macroinvertebrates taxa lists, 2) Compare macroinvertebrate communities between the two lakes, 3) Assess potential differences in macroinvertebrate assemblages along the water depth gradient, 4) Document vegetation zones in Post Office Lake, 5) Evaluate sampling methodology, and 6) Provide suggestions for future efforts. Activity traps and Hester-Dendy artificial substrates were used to collect macroinvertebrates, and various indices were calculated to compare communities between lakes. Vegetation in Post Office Lake was described by observations along transects from a canoe. Fifty-two aquatic taxa (primarily identified to family) were collected in Post Office Lake and 43 taxa were collected in Campbell Lake. Community indices indicated higher diversity of taxa in Post Office Lake, and overall more taxa present in the water column than the bottom of the lakes. Reed canarygrass was the predominant emergent vegetation in Post Office Lake. Efforts to reconnect Post Office Lake to the Columbia River, which was an impetus of this study, presently are on hold. However, study results are relevant to similar lake/wetland

reconnection projects, assessing value of marsh types to macroinvertebrates, and guiding management of water levels in impoundments.

Questions/discussion—

Q How would connecting Post Office Lake to the Columbia affect trust resources?

A The intent was to benefit salmon, but the Corps shelved it because they would not receive as much salmon credits as they had hoped. Our project was to collect baseline information on invertebrates. There are plans to conduct a wetland mitigation project on private lands at the south end of the lake, which our results may be relevant.

Q What birds were present?

A Canvasback, scaup, and dusky geese use the area. Diets of different ducks vary (vegetation versus invertebrates). Our methods focused on invertebrates, like snails, that are important to ducks.

Q What were the sample durations and processing?

A Activity traps were set for 48 hours and substrate samplers for 14 days. Invertebrates were picked from samples in the field without magnification and processed in the field.

Aquatic resource sampling and monitoring on McNary NWR (Kevin Goldie)

McNary NWR was established in 1956 to replace wildlife habitat inundated by the pool created by McNary Dam for the conservation, maintenance, and management of wildlife resources and its habitat. One goal in the CCP for McNary NWR is to “provide a diversity of high-quality wetland habitats for the benefit of migratory birds and other wetland plants and animals.” Two objectives were identified to achieve this goal. One objective is to increase the amount of high quality shallow marsh (e.g., through prescribed burns, removal of growth, recontouring shorelines, and chemical control of invasive plants), and the other is to maintain and improve aquatic bed habitats (e.g., through alterations in connections between McNary Sloughs, rotenone applications in sloughs to remove carp, re-establishing bluegill and other predatory fish in McNary Sloughs, and possibly reintroductions of submerge aquatic vegetation). A series of sampling and monitoring activities, addressing 11 habitat or natural resource factors (i.e., bathymetry, submerged aquatic vegetation communities, water clarity, water metrics, fish communities, zooplankton, benthic macroinvertebrates, turtle populations, waterfowl use, invasives, and bat populations), have been proposed for generating information for improving habitats in the four McNary Sloughs. Given budgetary constraints, the current schedule has omitted some activities (e.g., benthic macroinvertebrates, bat populations) and limited the extent of others (except waterfowl use and invasive species).

Questions/discussion—

Q Will omitted activities eventually be implemented?

A Yes, some will be paired with ongoing work at Umatilla NWR, which has ongoing rotenone projects, complementary work by other offices, or others that meet permit requirements.

Q Have other ways to deal with carp been considered?

A There are plans to replace fish screens, which would exclude adult carp and some fry, and eliminate direct connections among some sloughs. The hope is that these activities combined with targeted rotenone applications will permanently remove carp from three of the 4 sloughs. Rotenone treatments were made in the 1980s and 90s without altering slough connections, which was not very effective.

A Are lamprey present in the slough?

A Pre-treatment fish sampling is not likely to pick up lamprey. Not sure if they are present, but assume that it is unlikely based on poor habitat and abundant invasive species in the sloughs.

Progress on the Fisheries initiative to develop a long-term aquatic monitoring program for climate change at R1 NWRs (Sam Lohr)

As part of Fisheries Project Leaders' efforts to support the Service's strategic plan for climate change, staff have crafted a proposal describing a long-term aquatic monitoring program for climate change at NWRs on the mainland. Rationale for the program includes: 1) anticipated alteration of water temperature and hydrologic regimes of streams due to climate change, 2) potential effects on stream biota related to physiological tolerances, disturbance regimes, non-native species, habitat and food web modifications. 3) responsibility for NWRs, the Service's principal land base established for conservation, and 4) ability of results to inform conservation. The goal is to evaluate evidence of climate change in physical attributes at NWRs and changes in aquatic communities by addressing objectives to establish long-term sentinel sites on NWRs in each of the three ecoregions, describe how physical and biological attributes vary through time, analyze for temporal change, and assess relations between physical and biologic attributes. The approach considers sustainability of effort and consistency in physical attributes (i.e., temperature, hydrologic regime) and habitat (wadeable streams), and applies a subset of protocols developed by the EPA's Environmental Monitoring and Assessment Program. Fisheries proposed Bandon Marsh, Kootenai, Nisqually, and Toppenish NWRs for consideration as initial sentinel sites as a pilot project. The proposal has been reviewed by Project Leaders at the four R1 FROs.

Questions/discussion—

Q How were initial refuges picked?

A The four were our first shot based on a variety of considerations—ecoregions, ability to wade, previous-, ongoing-, or desire for fishery work at a site, and our perception—there are uncertainties about the conditions of some areas. We certainly are open to other alternative sites and other suggestions.

Q What are the reactions from refuge managers etc.?

A --Good approach to look at different types of sites, though but my refuge does not have appropriate sites. It would provide food for thought for restoration.

--See a lot of value in it, especially with restoration projects that have been completed that could be good sites for long-term study.

--Criteria fits and distribution makes sense, open to having Willapa included for consideration as a potential site.

--There really needs to more firm sites selection criteria than described so far and it should be transparent.

--Information being generated for Water Resources Inventory and Assessments might be helpful in identifying potential sites.

Q What about prioritizing sentinel sites based on species present, especially with the move toward surrogate species?

A Might not want to do that because species issues may not be applicable throughout the range. Seems that there is a tradeoff between selecting an ideal site versus where we have information and also logistical constraints, such as there presently is no funding for the proposed program.

Q Actions in watersheds can be outside our control and also mimic effects of climate change, how will you separate these?

A That is something that needs to be considered.

Q How about tying the proposal to the LCCs?

A That would be a step after Service programs are on the same page. We also want to share the proposal with the Regional Climate Board. We will send the current draft to everybody here and encourage you to let us know what you think.

Activities of the Regional Climate Board (Mike Hudson)

Climate change is a familiar concept today. Reference to it can be found in the news every day, whether it has to do with flooding, extreme storms, or accelerated loss of glaciers and polar ice. The challenge from a US Fish and Wildlife Service (USFWS) perspective is to identify that information that is relevant to our agency mission.

The Regional Climate Board (RCB) for USFWS-Region 1 was established in 2010. The mission of the RCB provides guidance, leadership and advice on projects and initiatives to address climate change in Region 1. This includes advising the Regional Director on climate change adaptation and mitigation action priorities and opportunities, long-range planning, program monitoring, in-reach, and outreach. The board is comprised of members representing the Budget and Administration, Ecological Services, Fishery Resources, Refuges, Migratory Birds/State Programs, and Science Applications sections of the USFWS-Region 1.

The objectives for the RCB relate to the three major strategies outlined in the USFWS strategic plan (USFWS 2010): engagement, adaptation, and mitigation. Engagement refers to promoting in-reach and out-reach efforts highlighting new and existing climate science; adaptation efforts and strategies for fish, wildlife, plants and ecosystems; and national and regional climate change priorities. Adaptation refers to developing adaptation strategies for the Region's fish, wildlife, plants and ecosystems, cultural resources and facilities; and ensuring that state-of-the-art climate change science is used in the Region's decision making and planning efforts. Mitigation refers to carbon footprint reduction and carbon sequestration efforts. The RCB is involved, either directly or peripherally, in a number of initiatives under each of these objectives (Table 1).

The mission of the USFWS is working with others to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. The uncertain future of climate change will bring challenges to the USFWS and its ability to achieve this mission. The RCB will continue to provide a valuable resource to Region 1 toward meeting this challenge.

Table 1. Examples of initiatives with which board members are involved to meet RCB objectives.

Objective	Initiative
Engagement	<ul style="list-style-type: none">• Monthly Climate Change Newsletter• Pacific Region Climate Change Sharepoint Site• Best Available Science Synthesis• LCC Communications

	<ul style="list-style-type: none"> • Webinars
Adaptation	<ul style="list-style-type: none"> • Vulnerability Assessments • Piloting a Strategic Approach to Conservation Planning and Design for the NWRS and Other Lands in the Columbia Plateau • Climate Change Impacts Monitoring Program
Mitigation	<ul style="list-style-type: none"> • Regional energy audits • CRFPO Carbon Footprint Team

References

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Questions/discussion—

--The Regional Climate Board is one of the few venues where we have been asked to bring issues from the field up to the regional directorate.

Update on the Surrogate Species Initiative (Paul Heimowitz)

Strategic habitat conservation is an adaptive management framework composed of five elements—biological planning, conservation design conservation delivery, outcome-based monitoring, and assumption-based research. Surrogate species are the focus of biological planning, intended to represent other species or aspects of the environment, and used for conservation planning addressing multiple species and habitats within a defined geographic area or landscape. There are several types of surrogate species (e.g., keystone, indicator, etc.), and planning can address one species or take a combined “portfolio” approach. The Service intends to use surrogate species to allocate resources, for which how to do so has yet to be determined, engrain SHC into daily business, track progress of conservation across landscapes and regions, and focus outreach and communication. For the current status of the initiative, 2,100 wide-ranging comments were received on the draft guidance and a National Review Team has formed. The Service has committed to revise the guidance based on comments and peer review, which will require several months, however, the Director has asked for a “Version 1.0” by the end of the year and some regions have already started to select surrogate species. Several groups have been established to further develop the initiative—the Executive Oversight Team (subset of Directorate), Business Management Team (budget applications), and AFWA-Service Work Group (role of States and partners). Region 1 is working on a draft game plan on how we might approach the initiative. The Directorate recently met about Version 1.0 and discussed it as a pilot that may include a landscape or region, priority species and preliminary surrogates, and any existing population objectives. The Willamette Valley could be a pilot for Region 1. The anticipated timeline is: revised guidance (late spring/early summer), peer review of guidance (summer 2013), finalize guidance (fall 2013), and Version 1.0 released by end of year.

Questions/discussion—

Q What about reaching out to other federal agencies, like NOAA, USFW, BOR, etc., should we not do surrogate species collectively??

A We have not reached out to other agencies enough yet. States have responded to us the loudest. We should do more federal outreach at the regional level.

Q Guidance talks about engaging the LCCs, has this been done?

A They are interested, but other agencies are not interested in putting a lot of energy into the concept.

Q Is there concern about trying to define population targets?

A Yes, they can be too high or low. However targets could be other measures like trend, not necessarily numbers. Intent of targets is that the public can relate to them and that they also can help justify our work.

Q Is using a suite of species as a single surrogate, like proposed by the American Bird Conservancy, a viable option; and could species groups be translated to a habitat perspective?

A This likely will be addressed in the final guidance, which could incorporate SHC. However, everything needs to be related back to species because that is the currency.

Update on the NWRS Inventory and Monitoring Initiative (Kevin Kilbride, Erin Stockenberg)

Program documents guiding initial structure and priority tasks (Operational Blueprint) and long-term development (Strategic Plan) of the I&M Initiative were finalized in 2011. A 7-year plan, which is available on the Natural Resources Program Center's fishnet site, was recently approved and identified 19 prioritized focus areas. The top three focus areas, in order, are I&M planning, water resources inventory and monitoring, and data management. The will be a major assessment for the status of objectives and tasks in the plan within the next three to four years. A national I&M policy and survey protocol handbook is expected to be available by the end of FY13. Specific activities of the I&M Initiative in Region 1 included: Providing Pathway Interns, one of which worked on five NWRs and included several fisheries/aquatics projects; Working on various plans and assessments (e.g., NWR I&M Plans, Water Resources Inventory Assessments, Refuge Habitat Management Database), and Supporting I&M Projects. Projects were solicited through a RFP process for which 24 and 23 projects were funded during FY11 and FY12 (\$815K and \$695K, respectively). Projects in FY13 emphasized data management.

The Integrated Refuge Information System (IRIS), which is Service-wide and hosted by ECOS, consists of centralized web applications for NWR data and the I&M initiative. Two applications are presently online (i.e., Planning and Review of Inventory and Monitoring Activities on Refuges—PRIMR, and Service Catalog—ServCat) and two are in development (i.e., Water Resource Inventory and Assessment—WRIA, and Species). Descriptions of current and needed surveys are entered into PRIMR with their priorities, and reports are generated to assist in the preparation of an I&M Plan for an individual NWR. Various types of information (e.g., maps, photos, data, survey protocols, and documents) are stored and cataloged in ServCat, which allows search and link functions (e.g., provides linkages between protocols and surveys in PRIMR). Reconnaissance-level inventories of water resources at a NWR (e.g., infrastructure, water rights, quantity, quality, management, and threats to supply) will reside in WRIA. The assessment portion will evaluate data and document recommendations by water resource professions to assist in NWR management and planning. WRIA reports have been completed for Nestucca Bay, Conboy Lake, and Camas NWRs in R1, and Grays Lake and Bear Lake NWRs are scheduled to be done by the end of FY13. The Species application will house occurrence data for birds, mammals, and vascular plants for all NWRs.

Questions/discussion—

Q What is the relation of WRIAs to the Regional Information Management Strategy (RIMS)?

A No clear connection right now because we are honing in on what will be coming out of RIMS. The RIMS summit identified the need to see what data bases and systems exist so that efforts for storing data are not duplicated, so that we work smarter. WRIA is at the national scale whereas RIMS is a region 1 strategy. In addition, ServCat is a tool that can be used beyond refuges where one can associate data with hatcheries for example.

--For PRIMR, Malheur will be the first NWR in our area inputting surveys needed for its I&M Plan.

Open discussion of updates, new issues and needs, upcoming work etc.

Mid-Columbia FRO: (RD Nelle) Work will be continuing at Toppenish NWR (i.e., looking at steelhead entrainment into waterways) by the fall when areas are re-watered. The Yakama Tribe is PIT tagging fish and collaborating on the project. The FRO is assisting McNary NWR to sample fish. Question was asked whether lamprey are present in the sloughs at McNary NWR – response was that sloughs probably would not have larval lamprey, though there could be some in Casey Pond. Access to the sloughs is limited and water temperatures in Sloughs 1-3 make larval lamprey unlikely there. Water conductivity is high, too. It will be interesting to see what is at the NWR. For Little Pend Orielle NWR, the FRO is repeating habitat assessments focused on riparian areas to see how things have changed since cattle were removed years ago.

Oregon Coast NWR Complex: (Roy Lowe) The final CCPs for the three estuarine NWRs (Bandon Marsh, Nestucca, Siletz NWRs) were delivered today. The NWR is starting to implement some small tidal restoration projects at Siletz and still working with Mike et al. on fish surveys at Bandon Marsh thanks to an I&M grant. In the first year of restoration at Bandon Marsh, vegetation is dramatically changing. Fahys Creek is now in its original channel and a lot of archeological resources are being uncovered along the creek (old fishing lattices along both sides of the creek).

Tualatin NWR: (Erin Holmes) The CCP is done and the NWR plans to start writing restoration plans for targeted areas in the fall. Near Chicken Creek on the Atfalat'I Unit, the NWR will be eliminating two of four managed impoundments so that habitat can revert back to more native conditions. It would be great to have more I&M work going on there. Parts of the Unit will be open to fishing (e.g., the pier over the Tualatin River already gets use) and waterfowl hunting, and the first prescribed burn is being planned. It is uncertain whether Wapato Lake will become its own NWR. Work is continuing on a hydrologic study there and the opportunity for a fisheries component is huge.

Idaho FRO: (Mike Faler) Five bull trout were observed during the second year of snorkeling Myrtle Creek at Kootenai NWR. Bull trout density is very low, so the FRO is concerned about impacts to bull trout of having the creek open to fishing with no special regulations. Fish seem to be leaving the system and none were observed in spawning colors or pairing up, so it appears that they are not spawning in Myrtle Creek. Cascade Creek may have been inundated providing access by fish from the river, which potentially could compromise purity of the redband trout

population. The FRO will investigate it this summer. The Kootenai Tribe is moving forward with improving sturgeon habitat just outside of the refuge.

Ridgefield Complex: (Alex Chmielewski) The Lower Columbia Fish Enhancement Group is continuing an assessment at Pierce NWR for potential habitat projects (e.g., evaluating areas with groundwater for chum salmon spawning channels, passage at water control structures). There needs to be a better estimate of available habitat upstream of Pierce Lake to consider passage there, and western pond turtles need to be considered. At Steigerwald NWR, the Corps and BPA are looking at moving the diversion at the elevated channel and reconnecting habitats. It would take a lot of work (\$8-10 million). The Corps has backed off but BPA is still interested. At Ridgefield NWR, the project to reconnect Post Office Lake to the river has been shelved. The NWR is considering invasive plant control in Gee Creek and possibly connecting the creek to Carty Lake.

CRFPO: (Doug Olson) It seems logical that the National Fish Hatchery Program and Refuges would have a stronger management link. There are similar missions to both – conservation and public use. National Fish Hatcheries are undergoing similar planning exercises, so there could be a benefit for having a better management link. From a population mgmt. perspective and a public benefit perspective, seems like those things should work together. Example of refuge and hatcheries on the Green River (Mike Hudson). Could using areas on our refuges help our fish grow better? Fisheries has our own database system that could be linked to the I&M system – we’re supposed to be One Service, but there isn’t a very direct management link. At some level, there may be some duplication of effort. Erin S is looking into field data collection systems – does Fisheries have anything that they are using for this purpose?

Mid-Columbia NWR Complex: (Kevin Goldie) – Conboy Lake and a bunch of other CCPs are just about to come out. NPR reported that they want to turn Juniper Canyon into an off-site water storage area. Monument – long term inventory to photodocument springs on Rattlesnake Hills. Columbia – looking at flows and surveys for leopard frog, large bird surveys. Toppenish – steelhead PIT tag arrays, turtle and amphibian surveys. Conboy – bullfrog depredation on OR spotted frog study.

CRFPO: (Jeff Johnson) Temperature and depth loggers at Post Office Lake – could get some good temperature this next year. At JBH – seasonal sampling, found salmonids inside the tide gates every time they went out there.

Science Applications: (Paul Heimowitz) SSP RFP is out right now, so it might be a good opportunity to get some projects done. Multi-program projects are strong. Also, another option for potential money – reopened a fund for science. So, for FY14, there will be an increase in funding availability. Regions will be asked to identify their top 5 science priority themes – due back to HQ third week in June.

Nisquilly NWR: (Brian Root) : Nisqually – work on estuary restoration fish monitoring continues. It has been a few years of surveys – trying to get a feel for the initial response and now planning ahead for strategically monitoring into the future. Gray’s Harbor and Black River Unit of Nisqually – almost done with those CCPs. Glaring issues are the lack of information on

aquatic resources. Will be looking at opportunities to investigate water resources, baseline inventories. Primary factor is basic baseline inventories of what's out there. Hoping that the CCPs will be done this year, and will guide work to be done there.

Willapa NWR Complex NWR: (Jackie Farrier) At Julia Butler Hansen NWR, the setback dike will be built in August – October with 90 acres of estuary restoration (next year).

Willapa NWR – lots of monitoring – water quality, temperature. I&M dollars purchased equipment; funds to do vegetation sampling in the restoration area. Monitoring western pearlshell mussels on 4 refuge streams; would like to install thermographs to monitor water temperature. EIA veg sampling will be completed in June/July focusing on mudflat areas. Will do staff training on AIS to ensure invasives are not being moved between the Columbia and bay.

Lewis and Clark NWR – Karlson Island project – put on hold until next year

I&M Initiative: (Nadia Jones) – working on I&M ServCat annual narratives – over 300 scanned at this point. More will go live after she's done some quality control.

(Draft proposal sent to workshop attendees for review on May 14, 2013)

**Climate change: A long-term aquatic monitoring program at
National Wildlife Refuges in Region 1
May 2013 Draft**

Introduction

Effects of accelerating climate change on natural resources and associated ramifications for people represent an unprecedented conservation challenge. In response, the U.S. Fish and Wildlife Service has developed and is implementing a strategic plan (USFWS 2010) to help ensure the sustainability of natural resources (i.e., fish, wildlife, plants, and their habitats) under conditions expected from climate change and other environmental stressors. The Strategic Plan for Climate Change acknowledges considerable uncertainties in the specific conditions and rate of change for habitat attributes anticipated to result from climate change, and describes three strategies, adaptation, mitigation, and engagement, that the Service will use to address conservation under predicted environmental conditions and accompanying uncertainties.

Climate change is expected to affect multiple attributes influencing habitat and its suitability for various species in aquatic systems (e.g., Haak et al. 2010; National Wildlife Federation 2011). Specifically, climate change is anticipated to alter patterns of air temperature and precipitation, which will directly affect water temperature and hydrologic regime of streams and rivers (USEPA 2012). Direct effects of altered water temperature and hydrologic regimes on native aquatic species may consist of conditions that exceed physiological thermal tolerances or produce incompatible disturbance regimes for certain life history stages. Indirect effects may consist of altered processing rates of nutrients, modified habitat structure, or conditions conducive to establishment of invasive non-native species.

Fisheries Project Leaders in Region 1 identified three areas of emphasis to support implementation of the Service's Strategic Plan for Climate Change relative to fisheries and aquatic resources during their coordination meeting in 2011. The three areas were: 1) To evaluate potential climate change impacts on National Fish Hatchery programs and operations; 2) To develop and implement long-term monitoring of key aquatic species; and 3) To assist Region 1 National Wildlife Refuges (NWRs) to design and implement a long-term aquatic monitoring program for evaluating the impacts of climate change. All areas of emphasis were intended to support actions primarily addressing a better understanding of the status and trends of aquatic species and their habitats relative to climate change, potential adaptation strategies, and inventory and monitoring.

The third area of emphasis is of particular importance in that NWRs represent the principal land base managed by the Service, and the mission of the NWR system is to administer a national network of refuges for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats for the benefit of present and future generations of Americans. Thus, evaluating evidence of climate change on physical and biological attributes through a long-term aquatic monitoring program would provide information to assist in conservation at NWRs. Examples of how information may contribute to conservation include: 1) Providing an early indication of climate change effects on aquatic habitats and species; 2) Detecting changes in status of non-native species indicative of climate change or

presence of new invasive species; 3) Characterizing conditions so that adaptive management strategies can be considered in a timely manner; and 4) Detecting potential ecological surprises that may become more prevalent due to climate change (Lindenmayer et al. 2010). Such contributions to aquatic conservation also support objectives in the Region 1 Fisheries Program Strategic Plan (USFWS 2008), such as Regional Objective 2.3. Coordinate with Service NWRs and NFHs to identify and implement opportunities for increasing the quantity and improving the quality of aquatic and riparian habitat, and Regional Objective 3.2. Maintain healthy, diverse, self-sustaining populations of fish and other aquatic resources, by characterizing habitats and populations. Moreover, detecting effects of climate change may contribute to strategic habitat conservation, for example by indicating new aquatic habitat conditions that should be incorporated into biological planning (e.g., revising maps describing ranges in stream temperatures) or appropriate approaches for conservation delivery (e.g., incorporating hydrologic changes in determining the sizes of culverts to accommodate fish passage and transport of bed materials).

This document is a proposal for the long-term aquatic monitoring program for climate change at NWRs in Region 1, and describes the program's goal, objectives, considerations, methods, and estimated budget. The current geographic scope includes NWRs in Idaho, Oregon, and Washington, and involves each of the four Fisheries Offices in these states. We view selection of the NWRs to implement the program as an initial effort. We intend to explore opportunities to include additional NWRs representing a more complete coverage across the mainland portion of Region 1.

Goal, Objectives, and Considerations

The goal of the monitoring program is to evaluate evidence of climate change in physical attributes at NWRs and associated changes in aquatic communities. Specific objectives are to:

1. Establish long-term sentinel¹ sites representing mainland NWRs across the range of ecoregions in Region 1.
2. Describe how physical attributes vary through time.
3. Describe how biological attributes vary through time.
4. Analyze for potential temporal change in attributes by ecoregion.
5. Assess relationships in physical and biological attributes by ecoregion.

Major considerations in developing the program concerned the type of analysis (i.e., spatial or temporal comparisons of physical and biological variables) to use and selection of individual NWRs to include as a pilot project. Because questions of climate change primarily focus on long-term patterns in temperature, precipitation, stream flow, aquatic habitats, and biotic variables (USEPA 2012), our approach consists of temporal trend analysis at a sentinel site. Selection of individual NWRs for sentinel sites in the pilot project relied on representing at least one NWR in each of the three Level I EPA ecoregions (see Commission for Environmental

¹ As used here, sentinel sites are NWRs where a stream reach has been identified and standardized methods to describe and measure physical and biological attributes are applied through time, allowing assessment of temporal changes and associations among attributes at each reach.

Cooperation 1997) encompassing Region 1 (Table 1), and considering ongoing or previous monitoring activities, presence of naturally-maintained aquatic habitats, and other activities occurring off of the NWR that may affect aquatic habitat and species. Bandon Marsh, Nisqually, Kootenai, and Toppenish NWRs were selected for initial sentinel sites.

An additional consideration in the design of the monitoring program was the likelihood that it could be sustained in the long-term. That is, once the necessary infrastructure was in place at each sentinel site (e.g., stream temperature and stage loggers), cost of infrastructure maintenance, field crews, and data analysis would not be overly prohibitive into the foreseeable future. Ability of a trained crew of three individuals to complete field work at a site in a week (i.e., one week for each of four sites/NWRs during a year) was used as a minimum guide in estimating sustainability of our approach.

Methods

Methods for collection of physical and biological attributes are largely based on the U.S. Environmental Protection Agency's Environmental Monitoring and Assessment Program (EMAP) field operation manual for wadeable streams (Peck et al. 2006). The manual describes standardized field methods that have been applied at regional and national scales to characterize ecological conditions. Results of regional pilot applications of EMAP throughout the United States have successfully characterized ecological conditions using multiple biological assemblages in conjunction with physical and chemical habitat characteristics (Hughes et al. 2000). Although methods have been developed for large non-wadeable rivers and streams (Lazorchak et al. 2000), we are restricting the pilot project to wadeable streams, without direct tidal influence, so that sizes of selected streams are relatively similar and survey methods are consistent among sites.

The EMAP approach identifies stream channel reaches for survey relative to spatially-balanced random points in a stream network using a Generalized Random-Tessellation Stratified (GRTS) design. A GRTS design may be used to identify survey reaches at NWRs, especially those that possess a relatively extensive stream network, however, survey reaches ultimately may be determined by other considerations (e.g., availability of water temperature and discharge data or suitability of a reach for collecting such data, other management questions or information needs). Once the location of a survey reach is selected, its length will be based on wetted width (i.e., length 40 times mean wetted width with a minimum of 150 m for small streams; Peck et al. 2006).

The EMAP approach also identifies nine ecological indicators for assessing the chemical, physical, and biological conditions of streams and rivers (i.e., water chemistry, stream discharge, physical habitat, invasive riparian plants, periphyton, benthic macroinvertebrates, aquatic vertebrates, fish tissue contaminants, and rapid habitat and general visual stream assessments). Some indicators are primarily represented by single point measurements for a suite of variables (e.g., dissolved oxygen, pH, and conductivity for water chemistry), whereas others represent sampling throughout a reach (e.g., wetted width, substrate, and canopy cover, which are collected on predetermined transects to characterize physical habitat; and electrofishing or seining throughout an entire reach to collect aquatic vertebrates). All indicators are based on measurements made during the typical low-flow period. Because air and water temperature and

discharge are not only sensitive to climate change but also influence the thermal regime and physical structure of aquatic habitats, temperatures and stream discharge will be continuously recorded (e.g., hourly basis) at survey reaches. If these variables currently are not being monitored, temperature and pressure loggers will be installed and a rating curve developed to equate water pressure/stage to discharge.

Of the nine ecological indicators, we will use a subset of four most relevant to our goal and modify measurement of some variables to better address our objectives and considerations. The subset of indicators we will use includes water chemistry, stream discharge, and physical habitat to characterize structure and condition of aquatic habitats, and aquatic vertebrates to characterize biotic condition. Although assessing multiple assemblages of taxa is advantageous because each may possess different sensitivities and responses to stressors (Hughes et al. 2000), we selected aquatic vertebrate assemblages based on biological and logistical considerations. For biology, members of aquatic vertebrate assemblages typically have longer life spans and greater spatial requirements than members of periphyton and benthic macroinvertebrate assemblages. Thus, aquatic vertebrate assemblages integrate conditions over longer time periods and greater areas than the other two assemblages, which is more appropriate for a long-term monitoring program of climate change than assemblages with finer-scale sensitivities (i.e., responses assumed to be relatively immediate and strongly influenced by local conditions). For logistics, assessing periphyton and benthic macroinvertebrate assemblages would incur costs for services beyond the expertise typically in Fisheries Offices, which would reduce the likelihood of the monitoring program's sustainability. Indicators initially selected may be further modified relative to Peck et al. (2006) or expanded in consultation with NWRs. However, the following variables are proposed to be collected for each of the four indicators.

Water chemistry—Conductivity, dissolved oxygen, pH, and water temperature will be recorded from a point measurement made with hand-held meters below the water surface at the midpoint of survey reaches. The primary rationale for collecting these variables are to inform biological sampling by indicating appropriate electrofisher settings (i.e., via conductivity) and conditions during which sampling may be particularly stressful to sensitive species (i.e., via temperature, dissolved oxygen).

Stream discharge—Stage will be continuously recorded with appropriate instruments (e.g., pressure logger) and combined with rating curves to determine stream discharge for survey reaches. Air and water temperature also will be continuously recorded at survey reaches. All loggers will be inspected and data downloaded on a set schedule to ensure proper maintenance and reduce risk of losing data. It is assumed that NWR staff will download and maintain data loggers.

Physical habitat²—Various attributes of physical habitat will be recorded relative to: 1) Cross-section transects (i.e., cross-sectional transects starting at the downstream end of a reach and located at intervals 1/10 of the reach length, labeled A-K in Peck et al. (2006)); 2) Intermediate

² All components of physical habitat characterization in Peck et al. (2006) presently are included. To increase efficiency of field work, we intend additional review that may eliminate variables unlikely to contribute to the program (e.g., insensitive to climate, redundant with others).

transects (i.e., transects located at the midpoint between cross-section transects A-K); 3) Channel areas between transects; and 4) Riparian areas extending 10 m from each bank between adjacent intermediate transects. Habitat attributes and associated methods are:

- Thalweg profile (7.4.1)³—Thalweg water depth will be measured at 10-15 equally-spaced locations between cross-section transects, for which presence of soft/small sediments and channel unit and pool forming element categories (see Table 7-3 in Peck et al. (2006)) will be noted at each point.
 - Wetted width—Width will be measured at each cross-section and intermediate transect (21 total), and substrate size and water depth will be measured at 5 equally-spaced locations on cross-section transects and substrate size only measured at intermediate transects.
- Large woody debris tally (7.4.2)³—LWD (≥ 10 cm diameter and length ≥ 1.5 m) will be tallied between cross-section transects (see Table 7-4 and Figure 7-3 in Peck et al. (2006)) for each of three channel influence zones (i.e., zone 1 is baseflow channel, zone 2 is active/bankfull channel, and zone 3 is above active channel).
- Slope and bearing (7.5.1)³—Clinometers will be used to measure slope between water surface elevations at cross-section transects while keeping line-of-sight over water. Supplemental measurements over shorter distances will be made to avoid using a line-of-sight outside of the channel.
 - Bearing—Compass bearings between mid-channel points on adjacent cross-section transects will be recorded to estimate channel sinuosity.
- Substrate size and channel dimensions (7.5.2)³—Substrate size (see Table 7-7 in Peck et al. (2006)), water depth, and estimated embeddedness (10-cm circle) will be measured at five points (wetted edge on left bank, one quarter width, half width, and three quarters width, and wetted edge on right bank) at each cross-section transect; width and substrate sizes will be measured at five points on intermediate transects.
- Bank characteristics (4.5.3)³—Bank angles, bankfull width, height of bankfull above water level, undercut bank distances, and channel incision height will be measured on cross-section transects.
- Canopy cover (7.5.4)³—A densiometer will be used to measure canopy cover at cross-section transects standing at the mid-channel point/0.3 m above water/facing each direction (upstream, downstream, right bank, and left bank), canopy cover facing right bank from channel edge and also at the left bank will be measured.
- Riparian vegetation structure (7.5.5)³—While visualizing plots extending 10 m from each bank centered on each cross-section transects and extending 5-m upstream and downstream from cross-section transect, separately from each bank, the dominant vegetation type (deciduous, coniferous, broadleaf evergreen, mixed, or none) making up the canopy (>5 m), understory (0.5-5 m) and ground cover (<0.5 m) layers will be estimated, as will areal cover of large trees, woody vegetation in understory, and ground cover (see Table 7-10 in Peck et al. (2006)).
- Instream fish cover, algae, and aquatic macrophytes (7.5.6)³—Standing mid-channel and viewing areas 5 m upstream and downstream of each cross-section transect, the areal extent of cover types by category (see Table 7-11 in Peck et al. (2006)) will be estimated.

³ Refers to chapter section in Peck et al. (2006) addressing habitat attributes.

- Human influence (7.5.7)³—Types of human influence and proximity to the stream (see Table 7-12 in Peck et al. (2006)) visible from the riparian vegetation structure plots (i.e., from right bank and left), will be recorded.
- Cross-section transects on side channels (7.5.8)³—Cross-section transects will be added for side channels if $\geq 15\%$ of flow is in the side channel, otherwise side channel will be ignored.
- Riparian legacy trees (7.5.9)³—The largest tree within 50 m of stream banks associated between adjacent cross-section transects will be noted and tree type, height, dbh, and distance from wetted margin will be recorded.
- Channel constraint (7.6.1)³—Channel form and constraints will be assigned for the entire reach (see Table 7-14 in Peck et al. (2006)) after completing observations.
- Debris torrents and recent major floods (7.6.2)³—Evidence of floods and debris torrents will be noted after completing observations.

Aquatic vertebrates—Single-pass backpack electrofishing will be conducted throughout the entire survey reach to collect fish, amphibians, aquatic reptiles, and crayfish. Equal sampling effort will be applied to each of the 10 sub-reaches between adjacent cross-section transects and data will be tallied by sub-reach. The species and total length of all fish will be recorded, and individuals will be inspected for external anomalies. The species of all other vertebrates and crayfish will be recorded. Immediately after sampling the 10 sub-reaches, sampling adequacy will be assessed by calculating Jaccard's Coefficient (i.e., a similarity index) comparing combined species composition, excluding crayfish, between even and odd numbered sub-reaches. For coefficient values < 0.7 , which are considered indicative of inadequate sampling (Peck et al. 2006), an area representing two additional sub-reaches will be sampled and Jaccard's Coefficient re-calculated for all sub-reaches. Additional areas are sampled until values ≥ 0.7 , as permitted by time and available habitat beyond the original survey reach. All individuals collected will be returned to the reach except for any preserved for identification in the lab (e.g., crayfish) or retained for voucher specimens. Because aquatic assemblages reflect the integration of prevailing physical and biotic conditions through time, indices derived from various attributes of the assemblage (e.g., species richness, species relative abundance, ecological and physiological traits of select taxa) will be calculated to characterize condition of the aquatic vertebrate assemblage.

Frequency of surveys—Detecting evidence of climate change on physical attributes and associations with biological attributes is a long-term effort for which conducting a survey at 2-5 year intervals over decades may be adequate. However, determining variability, both annual and within a field season at sentinel sites, would assist in gauging adequacy of sampling frequency and also establish a baseline of initial conditions for the monitoring program. Thus, surveys of physical and biological attributes will be conducted annually for the first three years of the program, during which aquatic vertebrates will be surveyed three times during each field season (i.e., 12 aquatic vertebrate surveys per year total) to assess variability of assemblage metrics within the field season (see Whittier et al. 2007). Because duration of the low-flow period varies in streams, especially among ecoregions, an intent of assessing variability within the field season is to encompass a range of possible conditions (i.e., early-late during the low-flow period regardless of its overall duration) that likely would exist later when only a single survey would

be conducted. This will initiate generating the time series of physical and biological data for temporal analyses.

Timeline and Deliverables

Data collection in the field will be conducted during late spring-fall annually at each NWR by the respective Fisheries Office working with a NWR. Deliverables consist of an annual report with data and summaries for water chemistry, temperature, discharge, physical habitat, and aquatic vertebrates (i.e., species list, relative abundances, species tolerance index, and other community metrics) for each NWR. Electronic files of the report and data will be available for uploading to Service data bases (e.g., the FWS Service Catalog “ServCat”) and Fishery Offices’ web sites for dissemination. Results of the pilot studies will be presented at the annual Fishery Resource Office Project Leaders meeting and NWR-Fisheries workshop. Direction for analyses among sentinel sites and where to continue sampling will be discussed at these meetings.

Budget

Estimated cost for conducting surveys for the initial year of the pilot project is \$40,000 (\$10,000 for each Fisheries Office). The estimate does not include costs for recording stream discharge and temperature because gauging stations may exist in some areas or potentially could be established by other programs. Adequacy of the budget should be periodically assessed for long-term implementation of the program.

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Table 1. R1 mainland NWRs in columns by Level I, II, and III ecoregions (first, second, and third rows, respectively) and LCCs. Italicized NWRs consist of maritime reefs, rocks, islands, and headlands that were not considered appropriate for the regional aquatics monitoring program. Bold NWRs are considered most appropriate locations to initiate monitoring program in each ecoregion based on ongoing, previous, or planned monitoring activities. (Ecoregions after Omernik available at <http://www.epa.gov/wed/pages/ecoregions.htm>).

➡ Marine West Coast Forest			➡ Northwestern Forested Mountains				➡ North American Deserts				
Marine West Coast Forest			Western Cordillera				Cold Desert				
Coast Range	Puget Lowland	Willamette Valley	Cascades	Eastern Cascades Slopes and Foothills	Northern Rockies	Middle Rockies	Columbia Plateau	Snake River Plain	Northern Basin and Range	Central Basin and Range	Wyoming Basin
Bandon Marsh ¹	Dungeness ¹	Ankeny ¹	Franz Lake ¹	Conboy Lake ²	Kootenai ²	Grays Lake ²	Cold Springs ²	Camas ³	Hart Mountain ³	Oxford Slough WPA ³	Bear Lake ²
Gray's Harbor ¹	Nisqually ¹	Basket Slough ¹	Pierce ¹		Little Pend Orielle ²		Columbia ²	Deer Flat ³	Malheur ³		
Julia Butler Hansen ¹		Ridgefield ¹					McKay Creek ²	Minidoka ³	Sheldon ³		
Lewis and Clark ¹		Steigerwald Lake ¹					McNary ²				
Nestucca Bay ¹		Tualatin River ¹					Saddle Mountain ²				
Siletz Bay ¹		William L. Finley ¹					Toppenish ²				
Willapa ¹							Turnbull ²				
<i>Cape Meares</i> ¹	<i>Protection Island</i> ¹						Umatilla ²				
<i>Copalis</i> ¹	<i>San Juan Island</i> ¹										
<i>Flattery Rocks</i> ¹											
<i>Oregon Islands</i> ¹											
<i>Quillayute Needles</i> ¹											
<i>Three Arch Rocks</i> ¹											

¹ North Pacific LCC, ² Great Northern LCC, ³ Great Basin LCC

2013 Attendees (*italics—attended via phone and WebEx*)

Name	Office
Don Anglin	CRFPO
<i>Jenny Barnett</i>	<i>I&M Initiative—Turnbull NWR</i>
Jock Beall	Willamette Valley NWR Complex
<i>Linda Beck</i>	<i>Malheur NWR</i>
Alex Chmielewski	Ridgefield NWR Complex
Don Campton	RO Fisheries
Dan Craver	RO NWR Information
Joe Engler	RO NWR Biology
Mike Faler	Idaho FRO
Jackie Ferrier	Willapa NWR Complex
Bridgette Flanders-Wanner	RO NWR Biology
Kevin Goldie	Mid-Columbia NWR Complex
Kyle Hanson	Abernathy FTC
Paul Heimowitz	RO-Science Applications
Baker Holden III	WWFRO
Erin Holmes	Tualatin NWR
Amy Horstman	CRFPO/PFW
Michael Hudson	CRFPO
Jeff Johnson	CRFPO
Nadia Jones	CRFPO/I&M Initiative
Kevin Kilbride	I&M Initiative
Marci Koski	CRFPO
Eva Kristofik	Willapa NWR Complex
<i>Dave Ledig</i>	<i>Bandon Marsh NWR</i>
Laila Lienesch	Willamette Valley NWR Complex
Sam Lohr	CRFPO
Roy Lowe	Oregon Coast NWR Complex
Monte Mattsson	Portland State University
<i>RD Nelle</i>	<i>Mid-Columbia FRO</i>
Doug Olson	CRFPO
Steve Pilson	I&M Initiative
William Ritchie	Willapa NWR Complex
Brian Root	I&M Initiative—Nisqually NWR
Tim Roth	CRFPO
Pete Schmidt	Tualatin NWR
Brook Silver	CRFPO
Joe Skalicky	CRFPO
<i>Shaun Stephensen</i>	<i>Oregon Coast NWR Complex</i>
Sheila Strachan	RO Water Resources
Erin Stockenberg	I&M Initiative
Tim Whitesel	CRFPO

Action Items

The following are action items resulting from the 2013 NWR-Fisheries Workshop. Some are activities for ongoing projects and assistance that Fisheries has been engaged with NWRs during the past, as well as needs for which resources and plans have yet to be developed.

1. CRFPO work with Tualatin NWR to determine fish species composition and use of Chicken Creek and the Wapato Lake area, including associated creeks.
2. CRFPO work with Tualatin NWR concerning appropriate geomorphic and hydrologic evaluations to inform development of aquatic habitat restoration approaches for Chicken Creek and Wapato Lake.
3. Fisheries assist Willapa NWR in the design and implementation of fish and aquatic habitat monitoring conducted at the NWR.
4. Fisheries assist Willapa NWR with approaches to compiling and storing information generated by various monitoring activities associated with the Bear River Estuary restoration project.
5. Fisheries assist McNary NWR by providing fish biologist certified to conduct rotenone treatments to help with control of common carp in slough habitats.
6. Fisheries to distribute the current draft of the proposal to develop an aquatic monitoring program for climate change at NWRs to all workshop attendees for their review and comments.
7. Refuges, Fisheries, and Water Resources to coordinate on a formalized process that assesses existing data, disposition, condition, and various attributes of streams and their watersheds in the selection of sentinel sites for the aquatic monitoring program.
8. Field offices of all Service programs should let the Regional Climate Board know about any climate-related issues to ensure that the regional directorate is informed.
9. Fisheries to provide technical assistance to the I&M Initiative for developing I&M Plans and surveys in PRIMR (e.g., for Malheur NWR) and WRIAs (e.g., Willamette Valley Complex, which is scheduled to begin summer 2013).
10. MCRFRO to continue project assessing entrainment and movement of juvenile steelhead in waterways at Toppenish NWR using PIT arrays.
11. MCRFRO conduct habitat assessment focused on riparian areas at Little Pend Oreille to evaluate changes since cattle grazing was removed.
12. CRFPO and Bandon Marsh NWR to continue assessment of physical and biological attributes of tidal restoration project to characterize post-construction conditions.

13. IFRO to continue work at Kootenai NWR to assess bull trout presence in Myrtle Creek and investigate possible access of river fish into Cascade Creek caused by high water levels.


14. CRFPO continue to provide technical assistance on assessments for potential habitation restoration at Pierce and Steigerwald NWRs.

Workshop Presentations

Presentation: Hydrology at Wapato Lake and restoring the historic channel of Chicken Creek, Tualatin NWR. Presented by Pete Schmidt

Wapato Lake and Chicken Creek Restoration

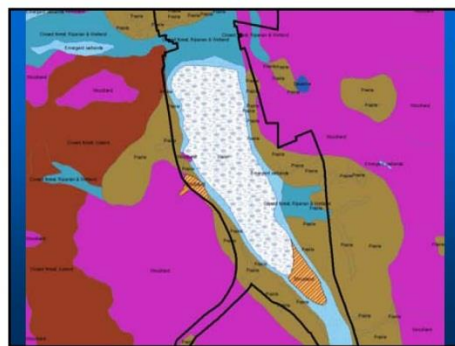
Pete Schmidt
Wildlife Biologist



May 2013

Wapato Lake

- **History**
 - 1200-acre wetland complex
 - Wet and dry prairie
 - Input from several creeks
 - Overflow from Tualatin R.
 - Did it maintain a connection?



Wapato Lake

- **Current**
 - Highly altered hydrology
 - Farmed
 - Subsidence?
 - Invasive species
 - No connections to creeks!



Wapato Lake

- LiDAR and ground surveys
- USGS water flow study
- Future – Hydro modeling
- Planning
- Restoration ???

Chicken Creek

● Background

- Chehalem Mt. & Parrot Mt.
- Includes Cedar Cr.
- 16.81 square miles
- 39.23 miles of stream

Chicken Creek

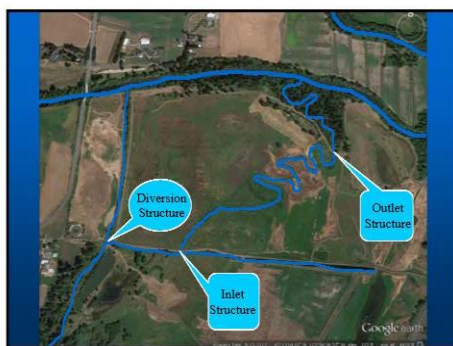
● Background

- Flows through Sherwood
- Empties into Tualatin River
- Fish species?

Chicken Creek

● Current

- Channelized portion and managed portion within wetland basin
- Diversion and fish ladder
- Managed wetland not functioning
- Flows in Chicken Cr. increasing with development in Sherwood





Chicken Creek

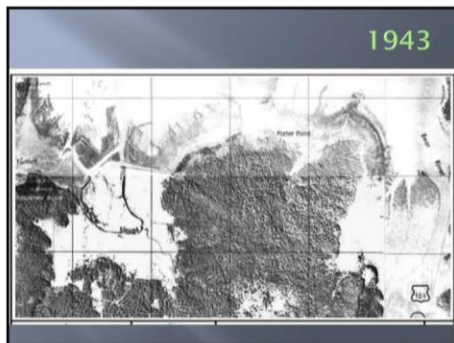
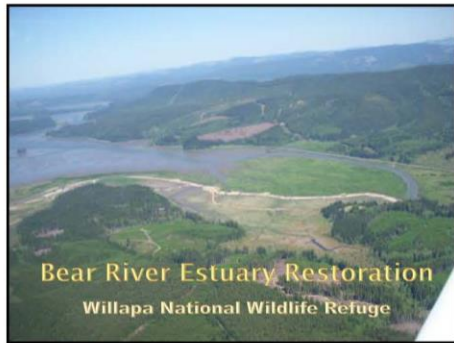
- OWEB — Conceptual design & preliminary engineering
- Future
 - Unobstructed fish passage
 - Conversion of wetland to prairie
 - Better floodplain connection
 - Maintain managed wetlands

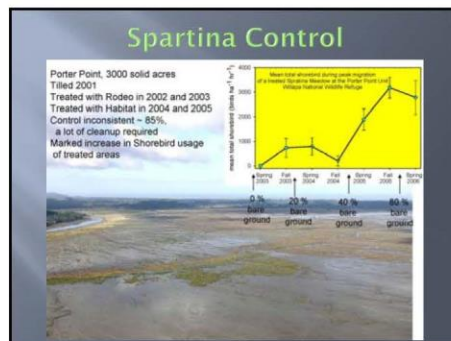
Chicken Creek

- What's next?
 - \$\$\$!
 - Design & engineering
 - Permits
 - Implementation
 - Monitoring

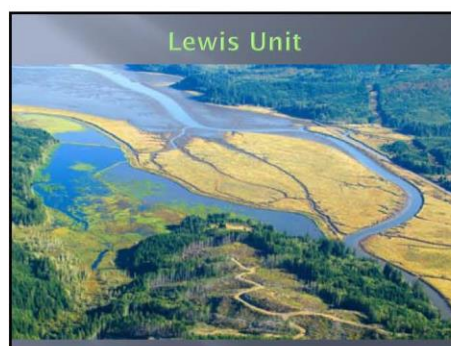


Presentation: Overview of Bear River Estuary restoration, Willapa Bay NWR. Presented by Jackie Ferrier





- ### Restoration Goals
- To rebuild a healthy, functioning natural estuary for:
- Ⓜ Migratory birds**
 - Increased feeding, nesting and resting in restored salt marsh habitat
 - Increased food web connectivity
 - Ⓜ Fish**
 - Increase foraging and rearing habitat
 - Provide access to spawning streams
 - Provide refugia from high flows & predators
 - Ⓜ Contribute to the overall health of Willapa Bay**
 - Increased water quality
 - Increased nutrient cycling & sediment transport
 - Increased resilience to climate change & sea-level rise
 - Reduce invasive species



2012 - Lewis Unit Restoration



Fish Ladder Removal



Stream Reconnection



Dike Removal



Surprises

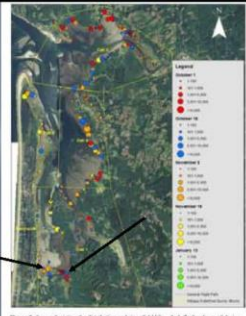


Migratory Birds



WDFW Aerial Waterfowl Surveys

October 2012–
January 2013



Spawning Surveys

- First use of chum salmon in over 60 years!
- Chum & coho salmon spawning in Lewis Stream
- Numerous juvenile fish observed in the estuary



Monitoring

- Avian
- Fish
- Vegetation
- Water quality
- Sediment change & channel morphology
- Photo points & aerial imagery
- Invertebrate



USCS Climate Change Project

Applying sea-level rise models at a paired node on a CDMX and S. NOAA sites along the Pacific coast

- Develop high-resolution digital elevation models
- Monitor water levels, tidal cycles and microclimate
- Evaluate sediment & organic matter processes
- Inventory vegetation species composition
- Determine and quantify wildlife species



Next Steps

- Continue working with stakeholders
- Secure funding for future phases of restoration
- Continue monitoring
- Visitor services opportunities
 - Open additional areas for hunting
 - Tarlatt Slough Trail and Overlook
- Other restorations

Other Estuary & Stream Restorations

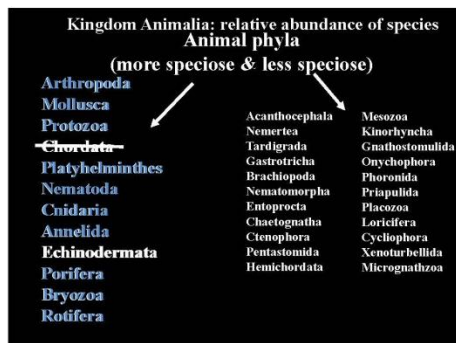





2013 Waters to Watch

1) Bainbridge Springs	TX	Desert Fish Habitat Partnership
2) Bear River Estuary	WA	Pacific Marine and Estuarine Partnership
3) Big Lake	AK	Mat-Su Basin Salmon Habitat Partnership
4) Cape Fear River	NC	Atlantic Coastal FID/Southeast Aquatics Resources Partnership
5) Chipola River	FL	Southeast Aquatics Resources Partnership
6) Grape Creek	CA	California Fish Passage Forum
7) Lake Corcor	TX	Reservoir Fish Habitat Partnership
8) Leech Lake	MN	Midwest Glacial Lakes Fish Habitat Partnership
9) Millennium Reserve Initiative	IL	Midwest Glacial Lakes Fish Habitat Partnership
10) Upper Tippecanoe River	IN	Midwest Glacial Lakes Fish Habitat Partnership

Presentation: Macroinvertebrate and vegetation survey 2012: Post Office Lake and Campbell Lake, Ridgefield NWR. Presented by Monte Mattsson



Macroinvertebrate

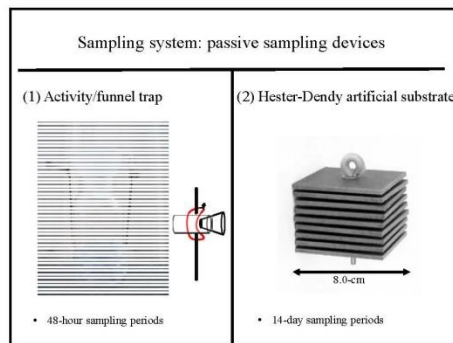
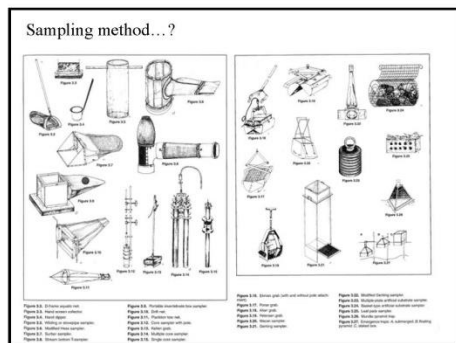
- invertebrate animal large enough to be seen without the aid of a microscope.
- "seen" ≠ identifiable
- in this study $\geq 500\text{-}\mu\text{m} = 0.5\text{-mm} = 1/50^{\text{th}}$ inch

Significance of macroinvertebrate survey

- important food resource for larger taxa (fish, birds, frogs, salamanders)
- detection of abiotic changes
- rapid generational turnover
- fixation of nutrients/energy transfer

Baseline data

- Post Office Lake reconnection to the Columbia River main-stem
- how or never?
- how will hydrologic changes affect macroinvertebrate and vegetation assemblages?
- *In situ* ecological experiment





Project objectives:

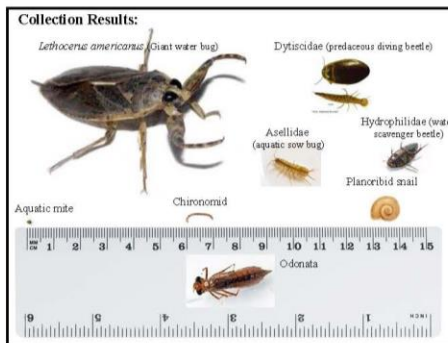
- (1) Create macroinvertebrate taxa list
- (2) Compare communities between PO/Campbell Lakes
- (3) Look for differences in macroinvertebrate assemblages along depth gradient
- (4) Document vegetation zones in PO Lake
- (5) Evaluate sampling methodology
- (6) Provide suggestions for future efforts

Sampling dates:
May-August 2012

	Post Office Lake	Campbell Lake
42.5-ha	53.5-ha	
Average max depth = 2.2-meters	Average max depth = 2.4-meters	
Clay (dominant substrate)	Clay (dominant substrate)	
Unconnected to main stem	Connected to main stem	
Unforested riparian zone	Forested riparian zone	
Average surface temp = 18°C	Average surface temp = 19°C	
Activity trap (21)	Activity trap (9)	
Hester-Dendy trap (29)	Hester-Dendy trap (10)	

Green=substrates
Red=activity traps

The figure consists of two aerial photographs of lakes. The left photograph is of Post Office Lake, showing a large body of water with a narrow channel connecting it to a larger water body. A legend in the top left corner indicates that green areas represent substrates and red dots represent activity traps. The right photograph is of Campbell Lake, showing a similar body of water with a different channel configuration. Both maps include a north arrow in the top right corner and a scale bar in the bottom right corner.



Results:
Obj. (1) Create taxa list

P.O. Lake

- 32,525 specimens
- 52 taxa:
 - 34 to family
 - 10 to order
 - 2 to sub-class
 - 2 to class
 - 2 to subphylum
 - 2 to phylum

Campbell Lake

- 8,872 specimens
- 43 taxa:
 - 28 to family
 - 9 to order
 - 2 to sub-class
 - 2 to class
 - 2 to phylum

Activity Traps

TAXON	Post Office Lake	Campbell Lake
Arthropoda	32,525	8,872
Insecta	32,525	8,872
Chironomidae	1,000	1,000
Dytiscidae	1,000	1,000
Hydrophilidae	1,000	1,000
Asellidae	1,000	1,000
Planorbis	1,000	1,000
Chironomid	1,000	1,000
Odonata	1,000	1,000
Aquatic mite	1,000	1,000

Results:
Obj. (1) Create taxa list

P.O. Lake

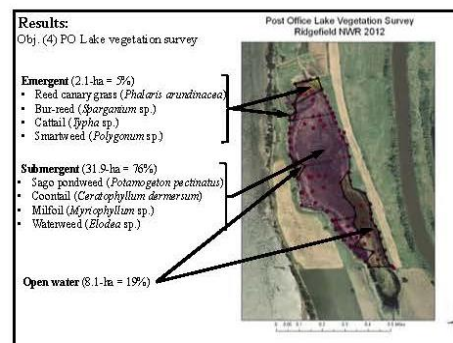
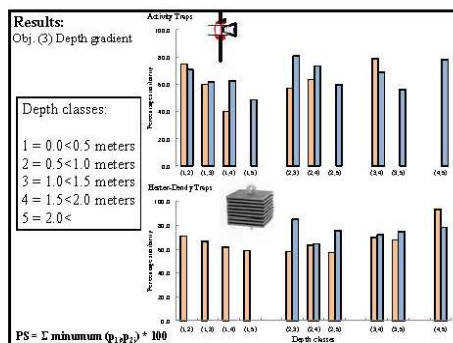
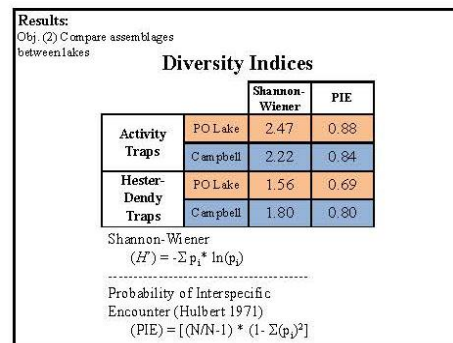
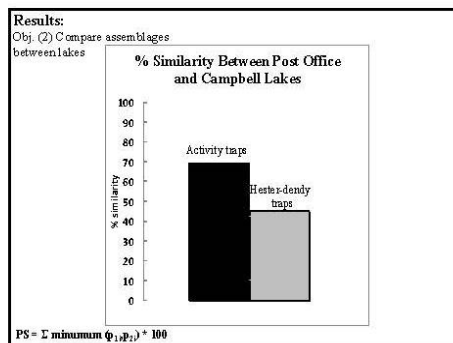
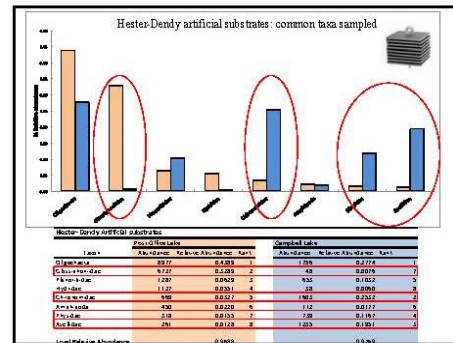
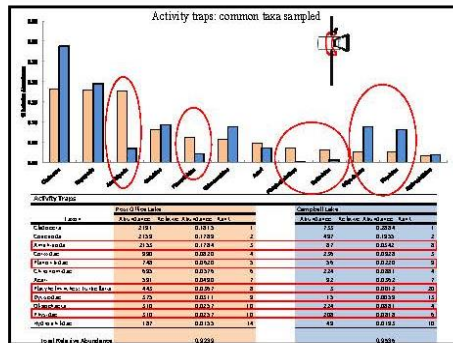
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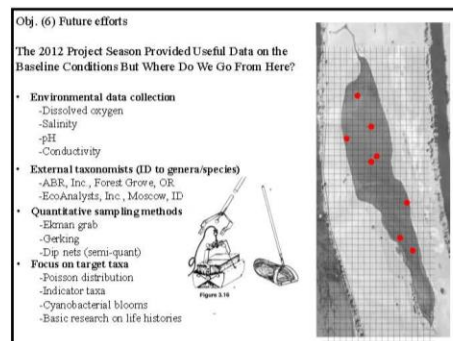
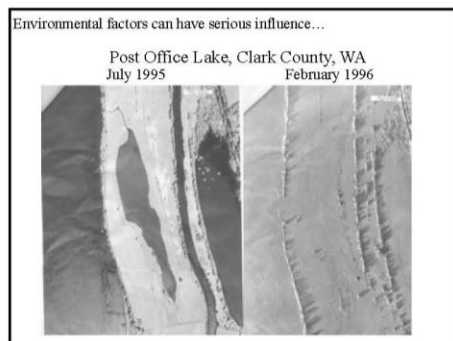
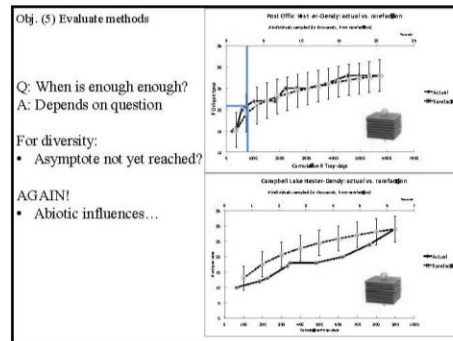
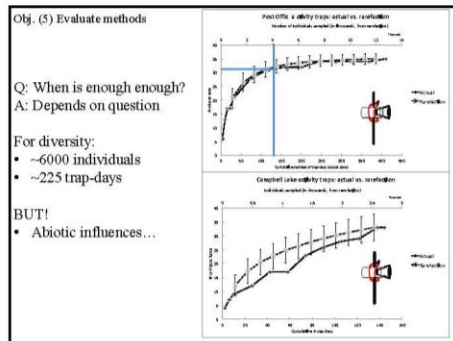
Campbell Lake

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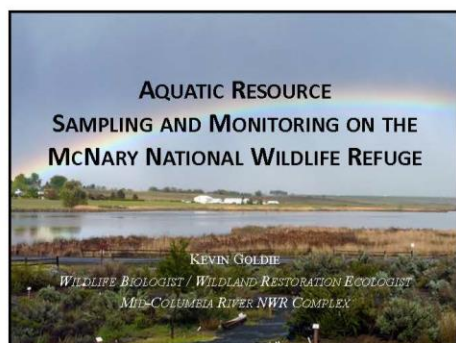
Hester-Dendy Artificial Substrates

TAXON	Post Office Lake	Campbell Lake
Arthropoda	32,525	8,872
Insecta	32,525	8,872
Chironomidae	1,000	1,000
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Planorbis	1,000	1,000
Chironomid	1,000	1,000
Odonata	1,000	1,000
Aquatic mite	1,000	1,000






Presentation: Aquatic resource sampling and monitoring on McNary NWR. Presented by Kevin Goldie



McNARY National Wildlife Refuge

- Established in 1956 under the authority of the Fish and Wildlife Coordination Act
- Created to replace wildlife habitat inundated by completion of the McNary Dam and pool in 1962 (44)
 - "...for the conservation, maintenance, and management of wildlife resources thereof, and its habitat thereon"
- Refuge currently ~15,850 acres
- Hosts the Mid-Columbia River NWR Complex HQ




McNARY National Wildlife Refuge

- Stateline and Juniper Canyon Units
 - 1,744 acres
- Wallula Unit
 - 2,369 acres
- Peninsula Unit
 - 7,639 acres
- Two Rivers Unit
 - 944 acres
- Burbank Sloughs Unit
 - 491 acres
- Strawberry Island Unit
 - 136 acres
- McNary Headquarters Unit
 - 2,999 acres






McNARY Comprehensive Conservation Plan

- McNary CCP, Goal 4: "Provide a diversity of high-quality wetland habitats for the benefit of migratory birds and other wetland plants and animals"
 - Objective 4a: Increase Amount of High Quality Shallow Marsh
 - Objective 4b: Maintain and Improve Aquatic Bed Habitats





McNARY CCP Goal 4

- Objective 4a: Increase Amount of High Quality Shallow Marsh
 - Rxburns
 - Mechanical removal of growth/recontouring of shoreline
 - Chemical control of invasives (e.g., Phragmites, purple loosestrife, Russian olive, swainsonpea, Scotch thistle, Kochia)

McNARY CCP Goal 4

- Objective 4b: Maintain and Improve Aquatic Bed Habitats
 - Alter surface connections between McNary Sloughs
 - Rotenone application in McNary Sloughs 4, 3, 2, and 1
 - Re-establish bluegill, and possibly other predatory fish, in McNary Sloughs
 - SAV re-introduction as necessary

PROPOSED SAMPLING & MONITORING

Proposed:

- Bathymetry
- SAV Communities
- Water Clarity
- Water Metrics
- Fish Communities
- Zooplankton
- Benthic Macroinvertebrates
- Turtle Populations
- Waterfowl Use
- Invasives
- Bat Populations



Separate but complementary research being done by Eastern Washington Field Office focusing on sedimentary and bogwader foraging habitat

BATHYMETRY

- Calculate rotenone application rates
- Determine sampling sites for other metrics
- To better describe and manage the waterbodies

Measure with:

- Calibrated, weighted line

Sampling Schema:

- Intersection points of a 25m 5' net grid



SAV COMMUNITIES

- Baseline data
- Species presence and relative frequency
- Inferred cover percentage
- Both quantitative and qualitative metrics

Measure with:

- 14-line bow rake
- Occupied lines and general cover classes

Sampling schema:

- 90% random sample of bathymetry points



WATER CLARITY & OTHER METRICS

- Pre/post-treatment comparative descriptive data
- Secchi Depths (Clarity/ Turbidity index)
- Water Temperatures
- Light Penetration and Relative Intensity
- pH
- Oxidation / Reduction Potential (ORP)

Measure with:

- Secchi disk (20cm disk, B&W quadrants, calibrated line)
- Pared HOBOP® Pendants®
- Extect® Extect® (or similar)

Sampling Schema:

- Bathymetry points
- Deep point(s) of waterbodies



FISH COMMUNITIES

- Baseline data ahead of (and after?) rotenone treatment
- Species presence and relative frequency
- Basic morphologic and community data

Methods:

- Electrofishing and/or netting

Sampling Schema:

- Being designed by Eastern Washington Field Office, based on their research goals



ZOOPLANKTON

- Required by EPA & WA-DOE
 - Relative abundance and mean length (mm) of cladocerans and copepods
 - Ratio of total cladocerans to total copepods
- Description of sampled individuals to family or better (WDFW recommended metric)

Methods:

- Wisconsin-style Plankton sampler, 35µm Nitex netting
- Up to first 500 individuals enumerated per composited sample

Sampling Schema:

- Up to 5 vertical tows in deepest part(s) of waterbodies; composited samples
- Pre-treatment & months 1 & 12 months post-treatment



BENTHIC MACROINVERTEBRATES




- Important food source for waterfowl, other waterbirds
- Rotenone known to have variable impacts on benthic communities
- Species presence/Community structure description

Methods:

- Petite Ponar Dredge
- Description of sampled individuals to lowest practical taxonomic level

Sampling Schema:

- 5 grabs from selected transects; composited samples follow BWO procedure
- Pre-treatment & 22 months (post-treatment)

TURTLE POPULATIONS





- Rotenone impacts on turtles are unknown
- Turtle populations, morphometrics, community structures, and phenologies on Mohave are undescribed
 - Mohave 225, 6 of 3, Objective 28
- Non-indigenous red-eared sliders have been seen in Slough 4

Methods:


- Mark-recapture (marginal scute notching)
- Sunning logs (passive presence-absence and gross activity monitoring)

Sampling Schema:

- Baited trap traps in channels
- Baiting traps to attract to deeper water
- Strategic placement of sunning logs

For some reason our trapping success wasn't great in this set.






WATERFOWL USE

- Waterfowl are one of the primary metrics used in Mohave NWR management decisions
- Use of off-river waterbodies is believed to be driven primarily by food availability

Methods:

- Morning and afternoon weekly counts, October – March, following set routes and times
 - "Open Science" Project
- Duck trapping, mid-to-late-summer
 - Related to an educational/outreach event
 - Qualitative method of duck presence and use of selected waterbodies

INVASIVES MONITORING

- Qualitative monitoring of invasive species presence, coverage, and phenology
- Primarily driven by invasives management actions (IPM)
 - Phragmites
 - Purple loosestrife
 - Kochia
 - Russian olive
 - Tamarisks
 - Scotch thistle
- Marked photopoints for monitoring changes over time





BAT POPULATIONS



- Bats have been shown to be indirectly influenced by rotenone use
 - Mountain lakes, removing non-indigenous trout
 - Likely related to food availability
- Action tied to a larger bat inventory project
- Monitoring for species presence, relative frequency, and "migratory" phenology

Methods:

- Automatic bioacoustic monitoring
 - Song Meter SM2BAT1






Sampling Schema:

- Fixed position year-round monitoring
- Periodic (rotational) monitoring

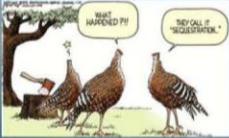
OTHER CONSIDERED METRICS

- Aquatic Invertebrates
 - Cost and personnel/work load issues
 - Other metrics may pick this up, but not vice-versa
- Amphibian Surveys
 - Frog Call Counts
 - Egg Mass Surveys
 - Drift Fence Surveys

CURRENTLY SCHEDULED SAMPLING & MONITORING

- Minimal Bathymetry
- Limited Water Clarity
- Minimal Water Metrics
- Limited Fish Communities
- Minimal Zooplankton
- ~~Minimal Macroinvertebrates~~
- Limited Turtle Populations
- Waterfowl Use
- Invasives
- ~~Sub-Chemical Use~~




Presentation: Progress on the Fisheries initiative to develop a long-term aquatic monitoring program for climate change at R1 NWRs. Presented by Sam Lohr

Progress on the Fisheries Initiative to Develop a Long-term Aquatic Monitoring Program for Climate Change at R1 NWRs



Progress on the Fisheries Initiative to Develop a Long-term Aquatic Monitoring Program for Climate Change at R1 NWRs



Why What Where How

Long-term Aquatic Monitoring Program at R1 NWRs: Rationale

Climate change – air temperature and precipitation changes expected to affect of water temperature and hydrologic regime

Effects on biota – physiological tolerances, disturbance regime, nutrient processing rates, habitat modifications, non-native species

Why at NWRs – Service's principal land base, established for the conservation, management, and restoration of natural resources

Results inform conservation – early indication of effects, non-native species, indicate need for actions, contribute to broad-scale efforts (landscape vulnerability assessments, SHC)

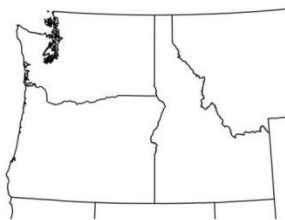
Long-term Aquatic Monitoring Program at R1 NWRs

Goal: Evaluate evidence of climate change in physical attributes at NWRs and changes in aquatic communities

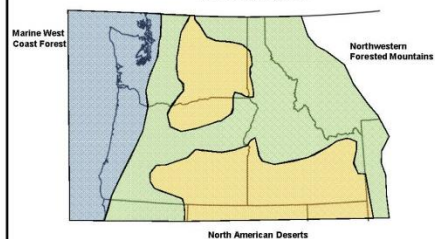
Objectives:

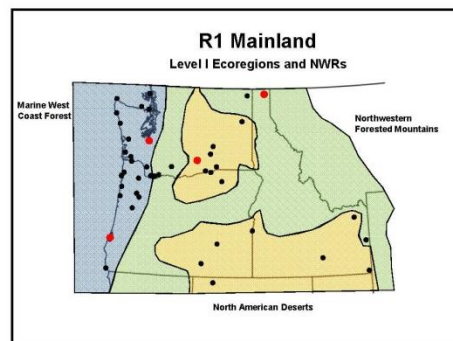
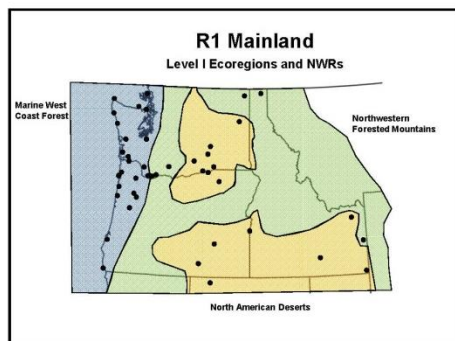
- Establish long-term sentinel sites representing mainland NWRs across R1 ecoregions
- Describe how physical attributes vary through time
- Describe how biological attributes vary through time
- Analyze for potential temporal change by ecoregion
- Assess relationships in physical and biological attributes by ecoregion

R1 Mainland



R1 Mainland
Level I Ecoregions





Long-term Aquatic Monitoring Program

Qualities:

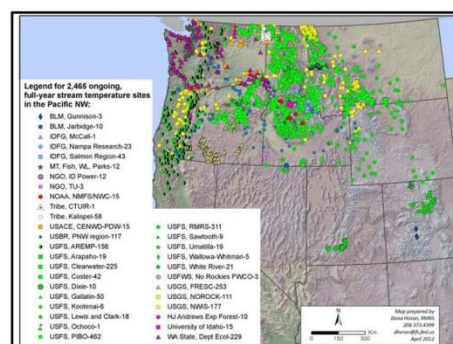
- Sustainable for resources required
- Consistency in physical attributes (temperature, hydrologic regime) and habitat (wadeable streams)

Methods:

- Subset of EPA Environmental Monitoring and Assessment Program protocols
- Minimum components—water chemistry, physical habitat, aquatic vertebrates (assemblage/community metrics)
- Temporal analyses once time series established

Status:

Fishery PL review (March) → NWR review (May) → -Science Apps
 -Water Resources
 -Climate Board



Presentation: Activities of the Regional Climate Board. Presented by Mike Hudson



Climate Change in the News

- Climate change is being included in US science teaching guidelines for the first time
- French wine could get pricey

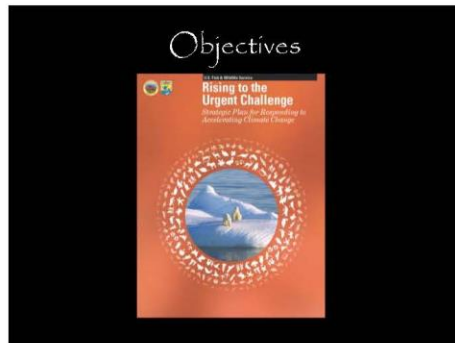


Mission

The Regional Climate Change Board provides guidance, leadership and advice on projects and initiatives to address Climate Change in Region 1. This includes advising the Regional Director on climate change adaptation and mitigation action priorities and opportunities, long-range planning, program monitoring, in-reach, and outreach.

Board Members

- Ecological Services
Chris Swenson (RO-Coastal Program)
Pam Drulliner (Idaho FWO)
Rowan Baker (Habitat Conservation)
Sergio Pierluisi (No Idaho FWO)
Shauna Ginger (OR FWO)
- Refuges
Ben Harrison (RO-Refuges)
Glynis Nakai (Maul NWRC)
Jared Underwood (Pac Islands I&M)
Jorie Clark (Cultural Resources)
Tom Mirewald (Refuge Info & SciApps)
- Migratory Bird/State Programs
Vanessa Lovett (RO-Mig Bird Management)
- Fishery Resources
Bill Gale (Mid-Columbia FRO)
Chris Peery (Idaho FRO at Dworshak)
Christina Luzier (CRFPO)
Don Campton (RO-Fisheries)
Michael Hudson (CRFPO)
Patty Crandell (Abernathy FTC)
- Science Applications
David Patte (RO-Sci Apps)
Mary Mahaffy (North Pacific LCC)
Stephen Zylstra (RO-Sci Apps)
- Budget and Administration
Tim Mayer (RO-Water Resources)



Objectives

- **Engagement**
 - Promote in-reach and out-reach efforts highlighting new and existing climate science; adaptation efforts and strategies for fish, wildlife, plants and ecosystems; and national and regional climate change priorities
- **Adaptation**
 - Develop adaptation strategies for the Region's fish, wildlife, plants and ecosystems; cultural resources and facilities. Ensure that state-of-the-art climate change science is used in the Region's decision making and planning efforts
- **Mitigation**
 - Promote carbon footprint reduction and carbon sequestration efforts

Engagement

- **Monthly Climate Change Newsletter**
 - Monthly Region 1 report providing abstracts and links to articles and other publications
- **Pacific Region Climate Change Sharepoint Site**
 - Provides an online library for Region 1
 - <https://fishnet.fws.doi.net/regions/1/Climate/SP/0Pages/Home.e.aspx>
- **Best Available Science Synthesis**
 - Synthesis document that provides summaries and citations for climate trends, downscaled and regional climate models, hydrologic models, species and ecosystem response, sea level rise, sea surface temperatures, ocean acidification, and other topics
- **LCC Communications**
- **Webinars**

Adaptation

- **Vulnerability Assessments**
 - Vulnerability assessments provide two essential contributions to adaptation planning
 - Identify *which* species, systems or management objectives are likely to be most strongly affected by projected changes
 - Identify *why* these resources are likely to be vulnerable
 - Sheldon/Hart
 - Hatchery Climate Change
 - Coquille Estuary
 - Bull Trout
 - Pacific Islands

Adaptation

- **Piloting a Strategic Approach to Conservation Planning and Design for the NWRS and Other Lands in the Columbia Plateau**
 - Goal of this project is to identify a suite of tools, data and expert opinion to address planning and design aspects of SHC and the evaluation of proposed conservation portfolios

Adaptation

- **Climate Change Impacts Monitoring Program**
 - Goal is to identify and/or generate long-term datasets for multiple species that:
 - Populate an assessment tool to track spatiotemporal trends in population and habitat metrics, providing insight to climate change impacts and directing future conservation actions at the landscape level
 - Inform predictive models of climate change impacts for a given species and/or habitat so those models and other decision support tools can be enhanced and more effectively used for conservation planning and guiding on-the-ground conservation actions at the local population level

Mitigation

- Regional energy audits
 - Service owned lands, facilities, and equipment
 - Leased space not included
- CRFPO Carbon Footprint Team
 - Goal is to quantify, track, and make recommendations toward reducing the office carbon footprint

Climate Change in the News

- Democrats say climate change may force impoverished women into prostitution
- Climate change could lead to more turbulent flights
- Climate change may make it harder for surfers to catch a good wave

FWS Mission

Working with others to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people



Board Members

- Ecological Services
 - Chris Swenson (RO-Coastal Program)
 - Pam Druliner (Idaho FWO)
 - Rowan Baker (Habitat Conservation)
 - Sergio Pierluisi (Wa. Idaho FWO)
 - Shauna Ginger (OR FWO)
- Fishery Resources
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 - Stephen Zylstra (RO-Sci Apps)
- Budget and Administration
 - Tim Mayer (RO-Water Resources)
- Migratory Bird/State Programs
 - Vanessa Lovetti (RO-Mig Bird Management)



Presentation: Update on the Surrogate Species Initiative. Presented by Paul Heimowitz

Surrogate Species and SHC: An Update



Photo by David Gunkle

Strategic Habitat Conservation Plan, Learn, Adapt

- An adaptive management framework composed of five key elements:
- Biological Planning ← **Surrogate species**
- Conservation Design
- Conservation Delivery
- Outcome-based Monitoring
- Assumption-based Research



What Are Surrogate Species?

Surrogate species are used to represent other species or aspects of the environment.

They are used for comprehensive conservation planning that supports multiple species and habitats within a defined landscape or geographic area.



Many types of surrogacy

Including:

- Umbrella species
- Flagship species
- Keystone species
- Indicator species
- Landscape species

➢ Can use just one, or a "portfolio" approach




How will we use surrogate species?


- To allocate our resources; "how" is TBD
- To further engrain SHC model into our daily business
- As a common "currency" to track our progress across landscapes and regions
- As a focal point for outreach and communication

+ by -



So where do things stand?

- Comment deadline ended on March 29
- Over 200 commenters (30 from Region 1); 2,100 discrete comments with broad range of suggestions
- National Review Team established



We're between a...



- Commitment to review and integrate feedback, improve the guidance, and complete peer review (which will take many more months) but...
- Some Regions have already begun to select surrogate species, and Director has asked for "Version 1.0" by 12/31/13


To help us move forward...

- Executive Oversight Team (subset of Directorate)
- Business Management Team (how will we apply to budgets, etc.?)
- AFWA-Service Work Group (role of States and other partners)
- Draft "game plan" for R1.... (how we might approach this)



"Version 1.0"

- A beginning.. (i.e., pilot)
- EOT/Directorate discussed last week; elements may include:
 - One landscape/region
 - List of priority species
 - Preliminary surrogates
 - Any existing population objectives
- Willamette Valley = R1 V1?

Next Steps – Anticipated Timeline



Questions/Thoughts?



Presentation: Update on the NWRS Inventory and Monitoring Initiative. Presented by Kevin Kilbride and Erin Stockenberg

U.S. Fish & Wildlife Service
Region 1 Inventory & Monitoring Initiative
National Wildlife Refuge System

NWRS I&M Initiative Update

Kevin Kilbride, Regional I&M Coordinator
Erin Stockenberg, Regional I&M Data Manager

Joint Fisheries/Refuges Workshop 2013

U.S. Fish & Wildlife Service, Region 1 NWRS Inventory & Monitoring Initiative

NWRS I&M Program Documents Finalized January 2011

- Strategic Plan** for Inventories and Monitoring on National Wildlife Refuges: Adapting to Environmental Change
 - Long-term program development (2012 and beyond)
- Operational Blueprint** for Inventories and Monitoring on National Wildlife Refuges: Adapting to Environmental Change
 - Initial structure and priority tasks (FY2010-11)

Joint Fisheries/Refuges Workshop 2013

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I&M Roadmap

- 7-year plan (FY2013-2020) approved by NWRS Chiefs in April
 - Picks up where the Blueprint left off
 - Major assessment (status check) at 3-4 years
- 19 Focus Areas in priority order (see TOC) – each with objectives and tasks
 - Basis for preparing national annual work plan
- Available on NRPC's Fishnet site for I&M

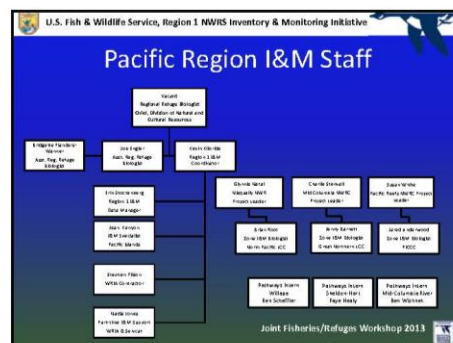
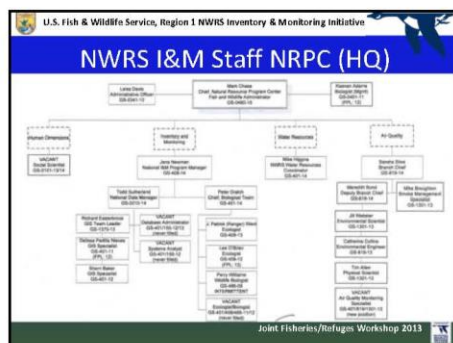
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I&M Policy & Survey Protocol Handbook

- Informal review – completed
- External review of the handbook coordinated by Rick Coleman's office - completed
- NRPC currently working on revisions
- Formal review under DTS – next and final step
- Approved policy by end of FY13?

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Pathway Intern – Ben Wishnek

Ridgefield NWRC

- Invasive plant mapping at Ridgefield, Franz Lake, and Pierce NWRS
- Pre-restoration invertebrate sampling on Post Office Lake

Bandon Marsh NWR

- Post-restoration fish monitoring

Julia Butler Hansen NWR

- Fish monitoring in freshwater tidal sloughs

Willapa Bay NWR

- Ecological Integrity Assessment (EIA) for terrestrial habitat types
- Pre-restoration soil monitoring for coastal prairie
- Streaked horned lark and snowy plover monitoring

Washington Maritime NWRC

- Invasive plant mapping and control evaluation on San Juan Islands
- Invasive plant mapping on Protection Island

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Region 1 I&M Work Activities FY 2013

Connect with priority tasks identified in the Roadmap:

- Assist with Refuge I&M Plans (List of Surveys) using PRIMR
- Partnering with WRB to support refuge WRIAs
- Support refuge HGMs (JC, Nestucca Bay, CB Lake, Camas, and Malheur)
- Support refuge I&M projects
- Support use of the Refuge Habitat Management Database (RHMD)

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Region 1 Priority Work Activities FY 2013 (continued)

Connect with priority tasks identified in the Roadmap:

- Water Quality Assessment Tool – USGS project
- Participate in Natl I&M Projects
 - ServCat
 - Wilderness character monitoring @ OR Coastal NWRC
 - Invasive plant inventory and mapping @ WA Maritime NWRC
- Coordinate w/other R1 Divisions and refuge staffs on regional I&M issues and pilot projects
 - Fisheries, RIB, Refuge Biology, Migratory Birds, EQ, Fire, Sci Apps
 - Examples: Aquatic Health Monitoring Network, Willamette Valley Refuges for CAP/WRIA integration pilot project, Wetland Topographic mapping @ Turnbull NWR, Wanape Lake Hydrologic studies that inventory water bodies/water quality

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Refuge I&M Projects

Request for proposals (RFP) process and memo announcing selected/funded projects

FY2011

- 24 projects funded at \$815K
- Send finished reports to your Zone I&M Biologist

FY2012

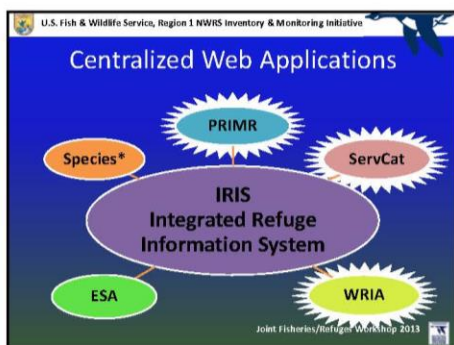
- 23 projects funded at \$695K

FY 2013 ("Data management" emphasized)

- 7 projects funded immediately; others funded later?
- 2 projects identified by NWRS Chief as regional priorities

FY 2014?

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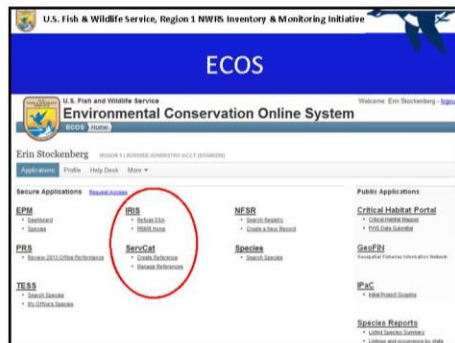


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IRIS Integrated Refuge Information System

- ECOS hosts all IRIS applications
- PRIMR and ServCat are online applications
- WRIA and Species are in development
- HQ leads all development and manages application development contract (i.e. all design, enhancements, and management)

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PRIMR

Planning and Review of Inventory and Monitoring Activities on Refuges

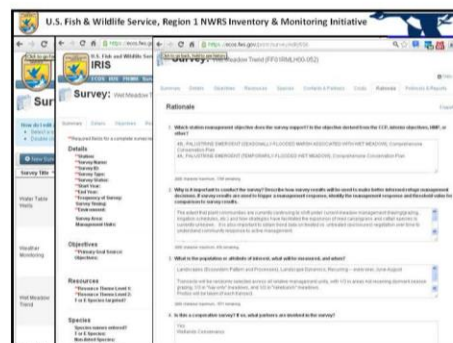
- Serves as a dynamic repository for current and needed surveys on individual refuges
- Links to ServCat for protocols and reports for Surveys
- Refuges list of surveys is prioritized and survey descriptions provided
- Reports are then used to prepare a refuge I&M Plan

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PRIMR Queries

- Surveys of a species across the NWRS
- Refuges utilizing a protocol or the same survey (e.g., Wintering Waterfowl)
- Protocols used on Refuges
- Surveys conducted in certain environments (NLCD, NWI)
- ecos.fws.gov/primr/index.gsp

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ServCat

"Service" Catalog

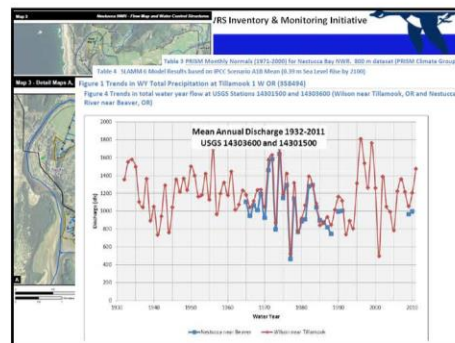
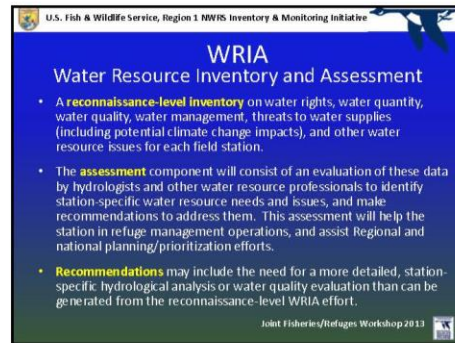
- Catalogs, stores, and serves FWS information resources
- Stores many reference types (documents, maps, photos, spreadsheet, geospatial, etc.)
- Metadata, Digital File Storage, Map Service, Search Functions
- Website


Joint Fisheries/Refuges Workshop 2011

ServCat focus to date:

- Nadia Jones- Part-time ServCat support
- "Priority" Documents
 - Annual Narratives
 - Management Plans
 - Technical Reports
 - Monitoring Data
 - WRIA
 - NRPC is working with NCTC to import 10,000-plus, Service authored journal articles.

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- 
- U.S. Fish & Wildlife Service, Region 1 NWIS Inventory & Monitoring Initiative
- # WRIA
- ## Water Resource Inventory and Assessment
- Stephen Pilson – developing/refining spatial layers to “inventory” refuge water resources:**
- Water resources and water rights
 - Infrastructure (e.g., WCS) and flow map
 - Threats and issues (e.g., WQ impairments – 303d, TMDLs; Climate change – PRISM)
- Assist/support from Other Divisions – FY13 Work Plan**
- Sheila Strachan and Tim Mayer – WRB
 - Dan Crayer – RIB
 - Nadia Jones – Fisheries (shared position w/IRM)
- Status of R1 refuge WRIsAs**
- Nestsucca Bay, Conlay Lake, and Camas – final reports in ServCat
 - Gray Lake and Bear Lake to be completed by end of FY13
- Joint Fisheries/Refuges Workshop 2013*

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Fishnet and WebSites

- Pacific Region I&M
- National I&M
 - Fishnet
 - Website

Questions?

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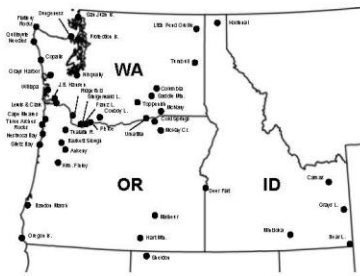
APPENDIX B: PROJECT REVIEW
(presentation by Sam Lohr April 18, 2013)

Fisheries Collaboration with National Wildlife Refuges

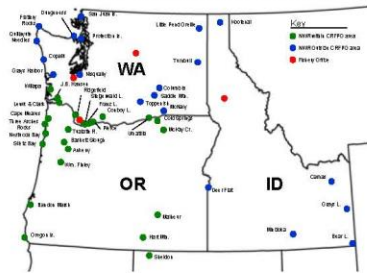


Sam Lohr
Columbia River Fisheries Program Office
Project Review
18 April 2013

R1 Mainland NWRs



R1 Mainland NWRs and FROs



Background and Rationale

- **STATUS:** History of NWR and CRFPO collaboration on aquatic resource issues
- **CONSTRAINT:** Work was sporadic, variable nature of issues, dependent on available staff and funding
- **SOLUTION:** Formalized approach for regular information exchange
- **DESIRED OUTCOMES:** Increased efficiency and coordination, support missions of both programs

NWR and Fisheries Guidance

NWR System Mission

Administer a network of lands for the **conservation, management, and where appropriate, restoration** of fish, wildlife, and plant resources and their habitats.....

- NWR purposes
- Trust resources
- Biological integrity, diversity, and environmental health
- Wildlife-dependent recreation if a compatible use

R1 Fisheries Vision

To **protect, restore, and enhance** fish and other aquatic resources to self-sustaining levels and support Federal mitigation programs...

- Protect health of aquatic habitats
- Recover and restore fish and other aquatic resources
- Opportunities to enjoy healthy aquatic resources
- Coordinate with NWRs to increase aquatic and riparian habitat

Goal: Collaborate with NWRs to conserve aquatic resources

Objectives

- Promote effective information exchange and coordination among programs
- Assist with development of comprehensive conservation plans
- Conduct field-based activities
- Provide non-field-based assistance



Objective 1: Promote effective information exchange and coordination among programs



Methods

- Convene annual workshop for NWRs, CRFPO, others
- Information exchange
 - Presentations, roundtable discussions
- Coordination
 - Plan activities during workshop or later
- Develop workshop report with action items

Results - Initial Workshop in 2005

- Information exchange
 - NWR templates and presentations
 - CRFPO expertise and results of projects (Franz, Pierce, Malheur, JBH, Hanford Reach)
- Coordination
 - CCP assistance
 - Assess NWR issues
 - Existing resources
 - Jointly pursue resources
 - Continue workshops



Results - Workshops in 2007-2012



- Information exchange
 - Total of 7 workshops
 - 5 reports posted, 2 in draft
 - Presentations by: NWRs-21, Fisheries-29, others-12
 - Topics: NWR-specific to broader
- Coordination
 - Attendees: 21-40 individuals, 4-9 NWRs, 5 FWS programs, 3 FROs
 - Up to 30 FONS proposals

Relationship among objectives



Objective 2: Assist with development of comprehensive conservation plans



Methods

- Assistance requested by RO or individual NWR
- Types of assistance
 - Literature search/review
 - Assist in crafting sections
 - Technical review internal and public drafts
- Participation on
 - Biological/management reviews
 - Extended planning teams
 - Briefings

Results

CCPs for 18 NWRs

- 2005 - Steigenwald, Franz, Pierce
- 2010 - Julia Butler Hansen, Lewis and Clark, Ridgefield
- 2011 - Willapa, Columbia, Ankeny, Baskett Slough, Finley
- 2012 - Sheldon, Malheur
- Draft - Bandon, Nestucca, Siletz, Tualatin
- Prep - Hart Mountain



Results - Example



Malheur NWR

- 2009 - Biological Review, preplanning lit. search and review for resources of concern (e.g., ICBEMP)
- 2010 - Draft habitat attributes for redband and river restoration approach, review/comment alternatives, goals, objectives, strategies
- 2011 - Review/comment on administrative draft
- 2012 - Public review draft

Objective 3: Conduct field-based activities



Methods

- Assess resources necessary to address aquatic issue
- Coordination - jointly pursue resources
 - Internal: FONS, Challenge Cost Share, Cross Program Recovery, I&M Program
 - External: BPA, USA COE, NFWF
- Implementation
 - Long-term (multiple FYs)
 - Short-term (single FY)

Results

- Proposals developed - Bandon, Nestucca, Willapa, Lewis & Clark, JBH, Ridgefield, Pierce, Malheur, Sheldon, Hart (est. 30 additional proposals)
- Long-term activities
 - 20 successful
 - 5 NWRs addressed
- Short-term activities
 - 2 successful
 - 3 NWRs addressed



Results - Habitat restoration monitoring at Bandon Marsh NWR



- Need identified in 2005
- Timeframes
 - Pre-construction fall 2007 - spring 2010
 - Interim fall 2010 - summer 2011
 - Post-construction fall 2011 - present
- Findings
 - Increase in species richness (e.g., anchovy, pipefish)
 - Salmonids distributed throughout restored area (e.g., upper reaches of new channels)
 - Archived invertebrates
- Funding sources-CCS, CPR, I&M

Results - Aquatic surveys at Sheldon-Hart Mountain NWRs

Guano Creek

- Need identified in 2005
- Timeframe - summer 2011
- Findings
 - Systematic approach applied to Virgin, Fish, and Guano Creek watersheds
 - Guano Creek example:
 - Species presence-trout
 - Species distribution all tiers (upper, middle, lower)
 - Habitat-characterized among all tiers
 - Established baseline for fish distribution and aquatic habitats
- Funding source - I&M



Objective 4: Provide non-field-based assistance



Methods

- Management planning
 - Analyses of physical and biological information to inform planning
- Habitat restoration
 - Review habitat restoration concepts and proposals
 - Assist with compliance documents
- Fish passage
 - Provide funding for specific projects

Results - Management Planning

Examples

- Macroinvertebrate functional feeding group ratios (Malheur NWR)
 - Indicator of stream attributes (e.g., substrate stability, riparian system, energy sources)
 - Used in geomorphic assessment
- Basin and hydrologic summaries (JBH, Steigerwald NWRs)
 - Described watershed features
 - Used to assess culvert and diversion structure



Results - Habitat Restoration

Example

- Review team for BPA/Corps conceptual projects at NWRs
 - Team developed evaluation approach and summary report
 - Briefed Regional Directorate
 - Met with BPA/Corps technical staff
- Continued assistance on individual projects
 - Post Office Lake-project elements and environmental assessment (Corps)
 - Karlson Island-justification and design alternatives (CREST)

Project Name	Location	Project Description	Project Status	Project Lead
Post Office Lake	Malheur NWR	Bridge replacement and habitat improvement	Completed	BPA/Corps
Karlson Island	Steigerwald NWR	Bridge replacement and habitat improvement	In Progress	BPA/Corps
...



Results - Fish Passage

Example National Fish Passage Program Funds

Nestucca Bay NWR



Malheur NWR



Conclusions

- Effective communication, coordination
- Fishery input
- Coordinated approach
- Opportunity to convey perspective, provide passage



Collaborate with NWRs to conserve aquatic resources

Future Direction

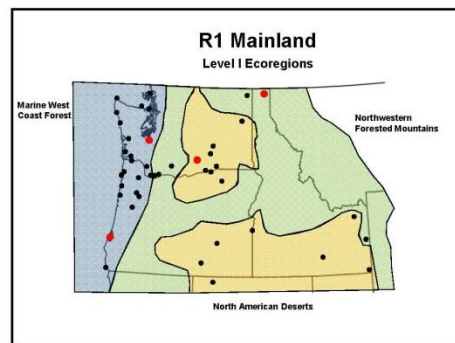
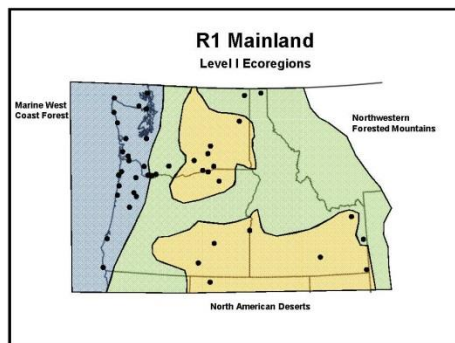
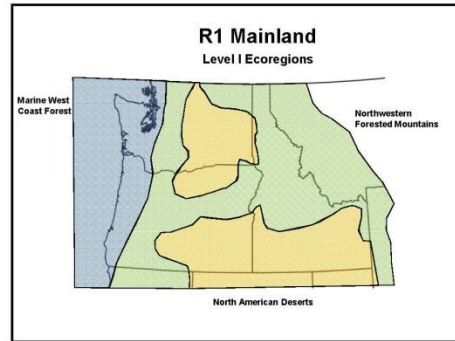
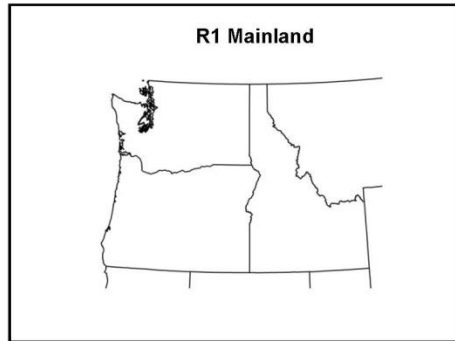
- CRPPO versus Region 1 in scope?
- Second wave of CCPs, step-down plans?
- Initiative for long-term aquatic monitoring program for NWRs

Long-term Aquatic Monitoring Program at R1 NWRs

Goal: Evaluate evidence of climate change in physical attributes at NWRs and changes in aquatic communities

Objectives

- Establish long-term sentinel sites representing mainland NWRs across R1 ecoregions
- Describe how physical attributes vary through time
- Describe how biological attributes vary through time
- Analyze for potential temporal change by ecoregion
- Assess relationships in physical and biological attributes by ecoregion



Long-term Aquatic Monitoring Program

Qualities:

- Sustainable for resources required
- Consistency in physical attributes (temperature, hydrologic regime) and habitat (wadeable streams)

Methods:

- Subset of EPA Environmental Monitoring and Assessment Program protocols
- Minimum components—water chemistry, physical habitat, aquatic vertebrates (assemblage/community metrics)
- Temporal analyses once time series established

Status:

Fishery PL review (March) → NWR review (ongoing) → Science Apps, Water Resources, Climate Board



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January 2015